OLDEST BEST

AUSTRALIAN

GARDEN & FIELD

ESTABLISHED 1875.

A MONTHLY JOURNAL
OF AUSTRALIAN AGRONOMY.

VOL. XXXVIII. No. 1. {Registered for transmission by Post.} JUNE, 1912. Price 6d. | Or 5/- per annum posted

What is Landscape Gardening?

W. Vortriede in "Horticulture" the question thus :—

"The term landscape gardening leaves such a vague idea, even in the minds of many well-educated people, that it would not seem out of place to discuss it quite frequently.

Landscape, or landskip, gardening is a modern word coined by Shenstone. Landscape gardening, says A. J. Downing, differs from gardening in its common sense in that it embraces the whole scene immediately about a country house, which it softens and refines, or renders more spirited and striking by the aid of art. So it means the art of beautifying and bringing into harmonious unity, by careful planning, the different scenic pictures out of doors.

The first attempts of art gardening were most probably in the geometric or formal style, which was brought to such perfection by the celebrated French artist LeNotre. It held sway all over Europe; but the good sense and great love of the Anglo-Saxon for nature soon shook off this wave of artificial art, and the true landscape-gardening art sprang up—the Natural or English style, as it is yet called in Europe.

The geometric was partly due to the limited material in use for gardening, owing to the ignorance of botany and the difficulty of obtaining appropriate material of natural plant form; hence form had to be carved out of growing plants. The burlesque, abominable, Rococo style of architecture of that time had a great deal to do with leading gardening into such a mechanical, artificial style; and this style of barbaric splendor is at present establishing a foothold in our country.

Let us turn in time from such a false path, with its limited, formal borders of artificiality, which create a wrong impression of real art by their ostentatious, laborious readiness. Let the wealthy of Europe and America possess such country estates if they want to, but guard the treasures of the common people, the park systems, against too much of such a style.

Most of the work of landscape gardening has happily been, until recently, in the natural style, due to the great stimulus imparted by the examples of the two above named artists. Some writers and lovers of formal gardening try to quote in defence of this style: "It goes without saying, that the true natural landscape garden debars all improvement by man;" meaning that a natural landscape is perfect as evolved by nature and should be left alone. Can such reasoning stand analysis? The term gardening at once excludes such a meaning. Landscape gardening, Downing says, is a union of natural expression and harmonious cultivation. The development of the beautiful is the end and aim of landscape gardening, as it is of all other of fine arts. The finest landscapes, such as painters love to perpetuate, are, in Europe, not the many formal gardens—let the photographers attend to that kind of art—but the seemingly pristine bits of scenery. But in densely populated Europe where are the untouched, natural landscapes? There is hardly a spot to be found where man has not been disturbing and working and arranging, in some way or the other, the scenery, even if unaware of it. But gardening permits such work with the object of improving, if possible, and presenting the choicest bits of landscape giving in its best form the natural style without showing the hand of man any more than can possibly be avoided; except in the superior beauty of specimens and groups, and the more perfect harmony in color of foliage and flowers of the native flora. We can hardly call a jumble of plants collected from entirely different countries, a natural landscape, even if harmonious in form and color.

Adolph Strauch says in the American Cyclopedia of Horticulture: The ideal landscape garden, like the ideal landscape painting, expresses or emphasizes some single thought or feeling. Its expression may be gay, bold, retired, quiet, florid; but if it is natural its expression will conform to the place. It should be a picture, not a collection of interest objects. J. J. Jarvis, in The Art Idea, speaking of Central Park, New York, says: An institution like this, combining art, science, and nature in harmonious unity, is a great free school for the people, of broader value then mere grammar schools; for besides affording pleasing ideas and useful facts, it elevates and refines the popular mind by bringing it in intimate contact with the true and beautiful under circumstances conducive to happiness and physical well being.

Sir Joshua Reynolds, in Discourses on Art, says: The beginning, the middle, and the end of everything that is valuable in taste is comprised in the knowledge of what is truly nature; for whatever notions are not conformable to those of nature, or universal opinion, must be considered as more or less capricious.

In Architectural Styles, Rosengarten says: If we wish for a landscape picture in accordance with our times, both the purpose and internal truth must be predominant, and at the same time everything that savors of pretence and unreality must be avoided; that is to say, all forms which represent something which they really are not, and express intentions which are not existent.

Does not the idea of all these great artists and philosophers, applied to landscape gardening, mean that it is a fine art? And that it is as such as little akin to formal gardening as to a pristine natural landscape?

A Nice Border.

Pyrethum, the "Dalmatian Insect Powder Plant," from the flowers of which "insect powder," "insectibane," and such insecticides are made, is worthy of a special place as a border plant. The foliage is pretty; it is extremely hardy, growing readily in all the sections of southern Australia, whether it be wet Gippsland or hot Broken Hill. It stands through the driest summer in the Adelaide plains without any artificial watering. Of course it dries off but recovers with the first rains of autumn. The flowers are white and pretty, and useful for wreaths, or, if picked, dried, and powdered, for insect powder which will destroy nearly all the home insect pests, fowl lice, etc., and when burned in a room full of mosquitoes, the latter fall to the floor dead.

Hardy Shrubs—Planting and Treatment.

— Shrubs for Small Gardens. —

A paper read before the Society of American Florists.

I will assume that we all understand by the term "hardy shrubs," the class of perennial bushy plants, deciduous and evergreen, though mostly largely deciduous, which are used for ornamenting lawns and gardens. Though mostly of moderate size when planted, some of them eventually attain the proportions of small trees. The term hardy will vary with the location of the planting, but will not materially affect the suggestion here presented. How to plant them will be considered in a two-fold light. First, the distribution and arrangement of the plants on the lawn, and second, the method of setting the roots in the ground.

As a general rule, the most effective way to plant shrubbery is in masses with not too much variety in one group. Prof. Bailey says: "The shrubbery masses should be placed on the boundaries ; for it is a fundamental concept of landscape gardening that the centre of a place shall be open. In most places the mass or border planting should be the rule and the isolated specimens the exception ; but unfortunately the rule is usually reversed." It is easy to see conspicuous evidences of the truth of the above statements in almost any suburban neighborhood in examples of good and of poor arrangements.

Many planters seem to think it desirable to have a well developed plant of as many varieties as can find accommodations on the lawn, in order that they might enjoy each plant individually as it passes through its varying changes of foliage, flowering, fruitage and leaflessness throughout year. Such an arrangement may be appropriate for an arboretum on trial grounds, and there are special charms in such a collection of shrubs as each successively comes into bloom. But as the blooming period of most shrubs is only from two to four weeks, the beauty of foliage hues both in the greenness of summer and in autumn foliage such as that of the golden elder and philadelphus, variegated weigela, purple-leaf plum and barberry etc., is considered done very effectively, but more frequently the result is a conspicuous blotch amid the verdure. The handling of bright colors always requires a high degree of artistic skill or the result will be displeasing to the most refined tastes ; it may afford valuable object lessons to the student and gardener but it is not the way to produce the most effective results in lawn adornment.

The quote again from Prof. Bailey's essay on shrubbery : " Plants scattered over a lawn destroy all appearance of unity and purpose in the place. Every part of the place is equally accented. The area has no meaning or individuality. The plants are in the way. They spoil the lawn. The place is random. In large grounds the shrubbery border should be composed of successive masses of several plants of one species together, followed by another harmonious group of another sort, the border of the two groups intermixing with each other, making a natural and easy transition from one variety to the other. Let the transition from one variety to another be gradual, not too sudden, and let the groups be not too large or too exclusive. An odd plant taller or different from the others may occasionally stand out or above its companions, very effectively ; of course tall growers at the back flanked with smaller and low branching species in the fore. It is not advisable to mix evergreen and deciduous shrubs in the same group. A few shrubs seem to be admirably adapted for filling in plants. Tamarix is one of these which may often be used to relieve a too monotonous sky line, or formality or to add variety in foliage effect, it being a tall, neat, inoffensive plant which will harmonize with almost any other.

One of the most satisfactory plantings of rhododendrons was a small bed at the south corner of a residence. They were wanted in this position but the owner had been told that they would not succeed in southern exposure. Recognizing the fact that a large pear tree southeast of this bed would afford midday shade, and groups of large forest trees and neighboring buildings not far away would afford shelter from wind, the location was considered eligible. The natural soil was quite sandy—but by generous excavation, two feet deep, and filling with muck and vegetable mould taken from open ditches on a nearby farm, and a few barrels of good peat, a soil was prepared which proved suitable. The rhododendrons were planted four to five feet apart and all vacant spaces filled in with Mahonia aquifolia, M. Japonica and heath arborvitage (Thuraericoides) until the bed was a solid mass of foliage, effectually shading the stems of the plants and the ground around them. The ground was then covered with a mulch of leaves a foot deep, with instructions to keep the mulch there all the time, renewing it every autumn, and as the rhododendrons grew and spread be cut back or removed. This planting was made

nine years ago, and has been successful.

— Shrubs for Small Gardens. —

A most difficult problem in shrub arrangement, more frequently met with in the practical experience of florist and jobbing gardeners than in the laying out of large lawns where general rules of landscape gardening might be employed is the requirement of owners of small yards, who want one dozen of their old favorites set in a bed or along a garden fence. Perhaps it will be a lilac, forsythia, snowball, cydonia, weigela, spirea, deutzia, chionanthus, dogwood, hydrangea and a purple filbert and such other incongruous neighbors. He who can arrange such a group as this tastily and so it will continue attractive throughout the year is a master in the art of shrub arrangement. Hopeless as this task may seem there are plants which we may always took to for help in such emergencies. The slender sprays of feathery foliage of the tamarix, the gracefully drooping branches of Spirea Thunbergii, Stephanandra flexuosa, the single flowered kerrias including the white form known as Rhodotypus kerrioides with its crinkled foliage, are all gentle, inoffensive subjects willing to help fill up a gap and hide from public gaze the awkwardness of their fellows whereever such service is needed. By adding a few plants of these slender species the stiffness of a group may be much relieved and some of its awkwardness softened.

One of my most valuable lessons about planting was learned in walking through a lawn with an old gardener who remarked, "The man who planted this place understood his business. See—every tree is set on a little hill or mound." The next time you have opportunity, compare the difference in appearance of a lawn where trees and shrubs stand in mounds slightly above the level of the surrounding lawn, and other plantings where the lawn level is carried up to the roots of the plants, or as is sometimes seen, where plants stand in a depression. See which you like best, and then judge of the wisdom of the above suggestion. A bed or border for shrubbery should be heavily manured and dug or plowed deeply and prepared as carefully as for corn or any other crop which is wanted to grow well. If I tell you not to run the roots into a little hole in the ground but to set them on a little mound, you will think I am joking, but that is pretty nearly what I mean.

It would seem as though every gardener should be tired of hearing the trite advice to dig big holes for shrubs and trees, but the innumerable evidences of violations of the rule show that many planters have not yet learned this lesson. Some shrubs, as forsythias, spireas, deutzias, etc., may flourish if stuck in the ground any way, but many others need the best of care to insure success, and carelessness in setting often discredits good material and a job which in other respects may be all right. Dig holes larger and deeper than the roots require and larger in diameter at bottom than at top, then fill in some of the best soil obtainable, making a little cone or mound in the centre of the hole. Then spread out the roots of plants around this mound of earth so that all roots tend downwards rather than horizontal or upwards. Fill in the richest soil, first tramping firmly as the filling proceeds. Remember Peter Henderson's chapter on the "Use of the Foot in Peanting." Also bear in mind that it is results that count and five minutes spent in care of planting may mean one or two years saved in attaining the desired end.

Under the heading "How to Treat Shrubs" I will allude to manuring, mulching and pruning. After planting apply a good mulch of manure to conserve moisture, furnish nourishment and suppress weeds. An annual mulching of leaves, with coarse manure to prevent their blowing away, is beneficial to almost every class of plants, and mulched or fallow ground is better than grass aeound the stems. Most deciduous shrubs should be pruned severely, when planted. Rhododendrons, azalias, andromedas, etc., are usually transplanted with balls of earth, and do not need much pruning but, where it is needful, will not hurt them.

— Pruning. —

The annual pruning is a most important part of the work of the care of shrubbery and the point most defficult to give instructions on by written derections. It is an art which must be learned by practice and observation. The general rule is to trim early bloomers, as soon as they are through flowering, and midsummer or late bloomers, in winter, contains a suggestion, but the indiscriminate cutting back of every shrub every year is a great mistake. When a shrub seems weak and needs strengthening, cut out declining shoots and apply manure around it. When one is too vigorous and rampant remove or shorten superfluous shoots and reduce to symmetry with as little mutilation as possible. When one has become overgrown and dilapidated in appearance, cut back a part, or perhaps all, of its unsightly stems, severely, probably at the ground, and allow new shoots to restore the beauty and vigor of youth.

Garden Notes.

— Seed Boxes and Pans. —

These form a most important item in the furnishing of a garden, especially if it be the intention to grow annuals, for it is by planting the seed at stated intervals that a succession of bloom is kept up in the beds. There are few things to compare in beauty to a garden filled with well-grown annuals. What a sight beds of the different colored candy-tuft make! Then, again, the blue lobelia, used as an edging, what is there to equal it? And the phlox drummondi, nemophila, and stock, the mignonette, godetia, and Virginian stock. But there is no end to the list of their variety. The trouble is to know what to grow and what not to grow, for, as I have often counselled in these notes, do not try to grow all of them, but make a judicious selection, taking into account, first, what you want them for, whether for the decoration of the garden or the beautifying of the rooms of your house; second, the size of the garden; third, its position; and fourth, its soil. In the following lists I have aimed at giving as complete a selection as space will allow:—

1. The following annuals are selected as being good cutting flowers — Sweet peas, ten-week stock, calliopsis, cornflowers, linarias, Shirley poppies, godetias, schizanthuses, phlox drummondi, scabious, gaillardias, annual chrysanthemums, collinsias, candytufts, gypsophila, malopes, nigellas, lupines, bartonia, and Venus's looking glass.

The heights of the foregoing are generally printed on the packet of seed, but if not there it can always be found in the well-appointed catalogues issued by the seedsmen. There will be no lack of good cutting flowers if these are grown, and they are also most effective in the garden. A point to be remembered is that all leaves should be removed from the part of the stem which is placed in the water, but not above.

2. All the following annuals can be sown where they are to grow, and are selected because of their fragrance:—Mignonette, sweet alyssum, sweet peas, stocks, nicotiana, sweet sultans, and scabious.

The following makes a great show when grown in beds or masses: — Linum grandiflorum (crimson), lupinus nanus (blue), godetias (white and crimson), nasturtiums (the dwarf kinds, crimson, scarlet, and yellow), nemopila (blue) escholtzias (orange), and clarkias.

4. Edging Annuals.—The following are of a dwarf compact habit and thus make good edging plants: —Lobelia, sweet alyssum, mesembryanthemum tricolor, nemophilas, Virginian stock, forget-me-not, saponaria, kaulfussia, platystemon, etc.

The flowering season of all annuals can be prolonged by preventing the plant from seeding; but this is almost impossible in some cases, as the labor would be so excessive, such as in the case of the nemophilps, candytufts, and collinsias. But if the sweet peas be allowed to pod the flowering ceases in a short time, whereas if the flowers be snipped off as they fade, thus preventing seed formation, and a sufficient quantity of moisture and food be supplied to the roots, flowering will continue throughout the season. It is the same with others that can be treated in a like manner.

Take up and divide herbaceous perennials, such as the daisy, polyanthus, cowslip, etc., and manure before replanting. Cuttings of pentstemons, zonale pelargoniums, carnations, pinks, roses, and fuchsias can be put in now and will be ready for planting out in the early spring.

The hoe is a most useful implement at this time of the year. The surface of the beds soon becomes battened down by the winter's rain, and the fork-hoe should be in constant use breaking it up again.

The cineraria and pansy planted out earlier must be given liquid manure at intervals, the soil moved round them, and all weeds removed.

The ten-week stock would also benefit by a similar treatment.

Roses and other shrubs and trees may be pruned. Keep the centre free from thick growth and remove weak and spindly shoots.

Deciduous shrubs and trees may be transplanted as soon as they are dormant, which can be recognised by the leaves being off. Stakes must be supplied to sweet peas as soon as they are out of the ground, as they grow so quickly and want a support at once.

In preparing beds for roses dig deeply and thoroughly mix with the soil a quantity of rotten manure, or if you prefer to use chemical manure dig in basic slag at the rate of three-quarters of a pound the square yards, and later on in the early spring hoe in a mixture of sulphate of ammonia and superphosphate in the proportion of one to eight, sowing it at

the rate of 10lbs. to 40 square yards of garden.

Carnations which were layered in summer time are now sufficiently rooted to be removed from the parent plants, the work is best done in moist weather. Where rust is prevalent an authority of carnation growing suggests that badly infected plants should be rooted up and burnt. Valuable varieties only slightly diseased might be treated as follows :—Take 2lbs. each vitriol and sugar, 4lbs. freshly slaked lime, and 27 gallons of water. Mix first the vitriol, lime, and water well together till clear, then add the sugar and mix thoroughly. Syringe the plants once a week early in the morning. The syringing should be done quickly, evenly, and finely.

Edging Plants.

I am not an advocate of "edging," preferring in small gardens that the shape of the beds should be defined by ornamental tiles or bricks or jarrah, but where these cannot be procured an edging of some kind is undoubtedly needed to give the design of the garden a more definite shape.

— Rosemary. —

At one time the old rosemary was a prime favorite, but owing to its grossness it has quite gone out of date.

— Fairy Rose. —

The fairy rose is justly high in popular favor. It must not be allowed to grow wildly, but should be kept in order by regular attention to clipping. This means extra work, and where it cannot be regularly attended to the fairy rose should not be grown. It strikes very easily from slips, which should be about six inches long, and planted so that only the two top buds of the cutting are out of the ground. In the spring time and for several months on this edging looks very beautiful.

— Box Edge. —

The box edge is also neat and trim when properly attended to, but has, in a greater degree perhaps, the objection to all edging, that it forms a harbor for snails, slugs, and other pests. It is propagated by cuttings inserted in the bed where they are to grow.

— Strawberry. —

The strawberry plant forms a very pretty border, even for a flower garden, and in the cooler districts has the additional advantage of supplying a delicate fruit for the table.

— Ivy. —

In England and other European countries the ivy is largely used as an edging plant. Pieces of ivy are planted at distances of three feet, and the long trailers trained round the edge of the bed.

— Pansies. —

Borders of pansies are very effective for the cool districts. For this purpose the plants should be raised from seed sown in a box. Transplant at 6-inch spaces when the seedlings are large enough.

— Polyanthus. —

The polyanthus tribe (English primrose, polyanthus, auricula, polyanthus primroses, English cowslips) is also very good for edging in the cool districts, such as southern Victoria and the hills. It would be much cheaper to raise these from seed than to procure the plants from a nurseryman, but the latter saves trouble, and is quicker. I fancy that the polyanthus primrose is the best of the different varieties, as it contains a greater diversity of color in its flowers.

— Pyretheum. —

Pyretheum, or Golden Feather, forms a good edging, its yellow or golden foliage presenting a very charming effect, contrasting well with the deeper green of the perennials in the border. It germinates very speedily from seed, and a single packet will produce several hundred of plants. It needs replanting every second year, as the plants become too large for the purpose.

— Daisies. —

The double English daisy (readily propagated by seed planted in a box, or by division of the root) forms a very neat edge, but owing to its uniform and dwarf habit it gives the garden a rather too regular and prim appearance. Otherwise it is one of the best edging plants you can have for the cooler districts. A drawback to it on the plains, however, is that it does not stand the hot weather of the trying summer any too well, unless given almost unlimited water.

— Violets. —

These old friends scarcely need any recommendation—they carry references with them. The violet likes a light soil, enriched with old manure, and if wood ashes are procurable the violet will be thankful for the addition. Unlike most other edging plants, this produces one of the sweetest of blooms for the decoration of the house; and as a garden is not a garden that does not possess a violet, when looking for a suitable edging plant we might go further and fare very much worse. To propagate them, select healthy runners in October or November. These must not be too long, and should be cut off close to the crown of the old plant. Insert in a bed of good, light, sandy soil. The whole length of the runner, except 1in. of the top, should be under ground. Let the young plants be kept moist during the summer by spreading over the bed a mulch of old manure. Keep all runners off the young plants, and by the following autumn they will have become nice stocky little plants.

— Annuals. —

Annuals are sometimes used as edging plants, but they are not altogether a success in that capacity, as after looking pretty for a week or two they go off—have to be pulled up, and the border replanted. Phlox and dwarf ten-week stock are about the best of the annuals to be used in this way, as they remain such a long season in bloom—longer by far than any of the others.

Chrysanthemum Show.

Visitors to the Chrysanthemum Show experienced a pleasant surprise, for contrary to expectation the display proved to be one of the best which has been staged in Adelaide. Not only were the "Mums" excellent but other classes were equally good. The award for the Champion Japanese was easily gained by the veteran Victorian grower, Mr. T. W. Pockett, whose reputation in his chosen flower is world wide. In Europe and America the Pockett creations are as well known as in the Commonwealth. The bloom staged by Mr. Pockett was a truly magnificent specimen of Edith S. Quittenton, a glorious white, which easily outclassed its rivals. Apart from this victory competition among the seven growers who were represented, was very keen, each class being well contested. Some of the varieties which were specially well represented, were the Hon. Mrs. Lopes, a variety which was champion last year; Stanley, Golden Gate, Maud Jeffries, Mr. W. A. Reid, Mary Ann Pockett, Lady Osborn, Miss Kellermann, J. C. Niel, S. F. Wright, Ruby Elland, Bendigo, Mrs. Duckam, Australian Gold, Pockett's Crimson, and Jumbo.

Amongst the Roses, a "Not for Competition," exhibit of Rayon D'Ors was easily the most attractive. This is, we believe, the first time this variety has been shown in Adelaide, and we have no doubt that its unique colouring and fine form, as shown in this exhibit, will lead to a big call being made for it this season. The Lyon Rose, of the same type, was chosen from one of Mr. Kemp's entries as the best in the show. This is also a novelty to most growers, but one which they should make a point of getting better acquainted with. Mr. Kemp was, as usual, the most successful exhibitor with Messrs. Howell, Hould, and Fairy in close attendance in the open classes. Messrs. Gibbons & J. W. Field were successful in the class for growers with under 100 and 200 plants respectively. The bowls of roses were an interesting class; in this Mr. Kemp had to give place to Mrs. H. H. Howell's delightful grouping of Madame A. Chatenays.

Amongst the Dahlias some of the finest flowers yet seen in Adelaide, were staged. There is no doubt of the increasing popularity of this Queen of the Autumn garden. Fine displays of the lesser known Single, peoney-flowered and collarette varieties, no doubt, made many friends for these charming additions to the great Dahlia family.

THE "CAVE" AND "LEWIS" TROPHY.

We have been asked to publish the names of individual blooms in the splendid exhibit which was awarded this much coveted prize. Miss Nicholas (the winner) has kindly supplied the following list:—

— Japanese. —

Hazel Eland, Jumbo, Mr. W. Collins, Lord Hopetoun, Mrs. T. W. Pockett, Mrs. Duckham, Annetta Henley, Maud Jeffries, Lady Osborne, Mrs. Thompson, Mrs. H. Weeks, S. T. Wright, F. T. Vallis, Aust. Gold, Miss Kellerman, Golden Gate, Madam Radialla, Winefred, W. A. Reid, Pockett's Crimson, Gladys Blackburn, Kerslake Jun., J. C. Neil, H. Stevens, Mrs. Cummings, Tom Carrington, Mary Ann, Pockett, Tom Trembath Olive Nicholas, Flora.

— Chinese. —

Prince Alfred, Patria, Eve, Ruby Eland, G. L. Atkins, Brockley Gem, Pio None, Lyn Jun., Antionella, J. Kerns, Violet Murchke, Bendigo, Drover, Miss M. Wannamacher, Mrs. Dennison, Joan d' Arc.

— Anemone Flowered. —

Pettridge, Dame Blanche, Mrs. H. Eland, James Weston, King, Surprise, Mrs. Shimmins, The Governor, Mrs. Trembath, Ettie, Her Majesty, W. Nicholas.

Sewell's Nursery,

The name of Henry Sewell has been long and honorably known in the world of Horticulture in its various branches, and very many years have passed since Mr. Sewell first established himself in his profession, but before doing so he had experienced considerable training which has stood him in good stead. Mr. Sewell has always been ready to help forward the cause in which he has been so keenly interested. As a writer on Horticultural subjects he, for many years, contributed to this paper. As a member of various Horticultural Societies he has been an active worker, whilst as an experimentalist he has also done good work. Passing years have brought him much success and the three fine nurseries which he now owns are testimony to the very exten-

sive business which he has built up. Mr. Sewell is much more than a nurseryman and plant seller, for he has always been really interested in the more scientific side of his work and Australian gardeners owe much to him. In Petunias, Pansies, and other lines the name of Sewell is recognized through the Commonwealth as one of the foremost exponents in plant breeding. As an importer of new and rare varieties for distribution, and as a collector, Mr. Sewell has taken a leading part. He has been fortunate in being able to gratify his tastes in this direction, with the result that his gardens, and houses, include an unusually large, and unusually interesting collection. In Aquatic plants, and in the Succulent tribes particularly, he has an almost unique display to show to visitors interested in these classes. The Payneham Nursery is nicely laid out, the greater portion being more of a garden than is usually the case. Many fine specimens, not commonly grown, may be noted, whilst the extensive range of glass houses contain a very extensive and varied assortment of the more tender plants, in which Mr. Sewell takes a very special interest. The extent of the stock carried and Mr. Sewell's ability to meet any order, however large, may be gathered from the fact that there are at all times over one quarter of a million pot plants ready for customers. In the shade houses, which are large and commodious, the visitor will find a delightful variety in palms and allied classes, and hardy ferns. He will also note, if he is at all observant, that the great collection of plants under Mr. Sewell's direction is clean and healthy. The Marden Nurseries, situated some few minutes' walk from the parent establishment, are devoted largely to Fruit Trees. The buyer will find here the same wealth of variety and evidence of the same careful handling. In the selection of fruit trees Mr. Sewell is always pleased to place his knowledge at the disposal of intending purchasers in the selection of varieties, likely to be suitable for their requirements, as to soil, climatic conditions, time of ripening, etc. Before leaving the Marden Nurseries we should mention that Mr. Sewell has an immense number of all the best varieties of table and wine grapes ready for this season's planting. At Aldgate Mr. Sewell has established a Nursery for the cultivation of trees, more particularly of shade and ornamental, all plants more particularly suited for hills' conditions. Within these limits there is the same wide choice as at his other nurseries, and the same evidence of expert management. Mr. Sewell's catalogues are always well arranged and well got up and may be procured on application to the only postal address, Payneham, S. Australia. Readers should not forget that Mr. Sewell's collection of Roses is unusually large.

The Last Rose of Summer.

People who during the last few weeks have travelled on the Unley tram line have had the opportunity of seeing the last rose of summer in all its glory at Mr. H. Kemp's Kingswood Nursery. In the old song, if we remember correctly, the last rose bloomed in solitary state—at these nurseries it blooms by the tens of thousands, for there are acres devoted to the Queen of Flowers. It has been a glorious sight at any time of the day, but those who have passed during the very early hours have been able to enjoy an added fragrance in the scented air. 'Tis even better to stroll through the nursery (visitors are always welcome) and examine more at leisure the beauty of all the favourites of the rose-world which are here grown in masses—from the dusky wine red tints of Prince Camille de Rohan to the spotless purity of the glorious Drushki, or one may enjoy the beauties of a bed of one of the best of all roses La France or one or other of the roses which everybody grows, Cochet, white and pink, K. A. Victoria, The Bride, and others. A little further on we may note C. G. Graham, Betty, Killarney, Joseph Hill and half a hundred of the newer beauties of the rose world. Not far off Rayon D'or flaunts, its vivid colors in the sunshine making its mark, even in this great collection Richmond and Warrior and others of that brilliant company make crimson patches in the distance, with Mrs. Walter Easly, Coxhead and Lieutenant Chaure, three of the best light red roses to soften and harmonise the whole. Nearer at hand that glorious rose, Georges Schwartz, leads a brave band of yellow teas and hybrids—Lady Hillingdon, Peace, Mrs. Leonard Petrie and others which carry the range of colour from deep gold to palest yellow. It is always interesting to know what other people are doing, and Mr. Kemp was emphatic in his opinion that the rose was more than holding her own in popular favour, and that amongst them the favourites of a decade ago are, broadly speaking, the favourites of to-day. Asked of the newer roses and how they were catching on, we were informed that though very far behind the output of the old favourites many of the newer have assured for themselves a permanent place in the Australian rose world, such as William Sheen, Mrs. D. McKie, Molly Sharman Crawford, Joseph Hill, C. J. Graham Mrs. Maynard Sinton, My Maryland, Principal A. H. Pirie, Soliel D'Angers, Mrs. Foley Hobbs, Mrs. Arthur Coxhead, Marquise de Ganey, Marie Delesaille, Marchioness of Waterford, Lieutenant Chaure, Mrs. John Craig, Lady Hillingdon, Madam Malamie Soupert, Juliet, Konigen Carola, J. L. Mock, Lady Illchester, Grafin S. Wedel, Excelsa, Eugene Boullet, Claudius, Madame Soupert, G. C. Ward, Cynthia Ford, Edward Mawley, probably the best Crimson H T in existence, Duchess of Westminster Elizabeth, Leslie Holland' and last but not least the Lyon Rose. Being a little curious as to how people selected their roses, we asked whether his customers sent in their own lists or left the selection to him, and were a little surprised at the answer, which was to the effect, that 95 per cent. did the former. He also mentioned that he was sometimes amused and sometimes almost saddened at the weird selections of roses forwarded. We were more than ever confirmed that our oft repeated advice to give your nursery man a free hand is good advice, especially when, as in this case, the choosing of roses will be in the capable hands of the proprietor of the Unley and Kingswood Nurseries.

Zante Currant Vines.

Mr. T. E. Yelland, secretary of the S.A. Farmer's Co-Operative Union, 32 Franklin Street, has a very choice selection of the above vine cuttings for sale. They are well matured, in a healthy condition, and will be sold cheaply by taking the lot (about 700), or smaller quantities may be had at usual market rates.

Planting Shade Trees.

Seedlings of soft-wooded trees are generally large enough to transplant from the seed beds, one year old, and the seedlings of hard-wooded trees from two to three years old.

From the time the seedling are placed in nursery rows, strict attention should be given towards developing one leader, and subordinating all side branches, and laterals to one straight stem. Shade trees when first planted in permanent positions should be clear of side branches from the base, up to, say about six feet, but the preparation for this should be a gradual process. It is well known that the growth of side branches give strength to the main stem, and the best results are attained when these are partially removed in the nursery row, and wholly removed to about the six feet limit when the tree is permanently planted.

Leaving all the side branches entirely unpruned in the nursery, and suddenly removing them to the necessary limits, when the tree is planted, we think is a mistake.

In the rush of tree planting, nine-tenths of which is usually done in spring, notwithstanding the wisdom and much better way of doing it early in the fall, the pruning and smooth dressing of all bruised and lacerated roots, and the cutting back of long straggling ones, proportionately should never under any circumstances be neglected.

Of late years I have come to the conclusion, that in the pruning of healthy, well-balanced hard-wood trees, when they are planted, their leaders should be left uncut, but the side branches should be well cut back. They begin root action more rapidly, and start into vigorous growth more freely, if the side branches are severely pruned.

I have come across some horticulturists of late years, who have reasoned with me, that, if trees are perfectly dormant, when they are transplanted, pruning is unnecessary. I have no hesitation in saying that theory, observation and practice are opposed to this, and I have seen much poor success, and a good many failures due to this neglect.

When trees start from a good foundation, a little occasional pruning, to remove any congested, or decrepit branches, and to regulate symmetry of the lower limbs extend, it is best to cut them close to the trunk, as the trimming of the pendent twigs is only a temporary relief.

Some trees usually produce dense heads of overcrowded branches, and this congestion causes some of the limbs to decay. Such trees can be benefited by a little thinning, but the branches should be cut close to the trunk. To cut them partially back only aggravates the evil of density. It is trite advice to give to any one who has any understanding of the leading principles of pruning, that in the cutting back, and removal of all branches wherever necessary, scrupulous attention should be paid towards cutting close to "joints" or to the trunk, and covering all wounds of any considerable extent, with coal tar, to exclude rot and fungoid deseases.

The practice quite frequently seen of removing the tops of street trees or "heading back" for no reason whatever, when they are otherwise healthy, is a form of barbaric butchery that cannot be too strongly condemned. How the "professional tree trimmer" can induce some intelligent people to have their trees treated in this way, passes comprehension. Thousands of trees are today dying slow deaths from this cause.

There are conditions in the lives of some full-grown trees when the heroic treatment of pollarding may be resorted to intelligently, but it is a dangerous practice.

Garden Paths.

One of the most important points in the laying out of new grounds is the making of the paths and walks. These have tried the patience of a great many generations of gardeners, for weeds will grow on them, disfiguring their surfaces and stones and rocks will work up, making them rough and uneven. One good plan is to dig out the soil of the path to a depth of 5 to 6 in., but if the stones to form the foundation are rather large it will be found necessary to dig it deeper. Care must be taken as you advance to the top that smaller and closer fitting materials are used.

It is important that materials disliked by the earth worm be used, such as rubble and broken mortar, stones, and brick-bats, clinkers, or rough cinders; rough gravel will follow next, and then a covering of sand, and the whole made firm by rolling well with the garden roller.

I have seen a good path made by filling in the excavation with 2 or 3 in. of rough stones like road metal. This was covered with coarse sand, so as to amply hide all the stones, and after the surface had been well rolled and made smooth an inch or two of white sea shells was placed on top. This made a most pleasant walk.

The shells soon got broken, and after rain or even while it is raining they are in better order than at any other time. The weeds, too, are more easily removed than from the surface of a hard-setting gravel path.

Concrete paths are preferred by some. These are prepared in the following way :—Dig out 4in. and

fill in with rough stones or gravel to a depth of 3in., water and roll well, then place 1 or 2in. of concrete oo the top; this must be well rolled also, and given a good watering. Next a thin covering of fine sand or finely-sifted gravel should be spread over and the roller again put over it until the gravel forms part of it, as it were. And when the whole is dry a pick would hardly break the surface. The concrete is made by mixing coarse gravel and sand and lime in the proportions of five to one.

— Asphalt Paths. —

Some prefer these. The following is the method of forming them :—The materials are stone screenings and gas tar. The screenings should have as little dust as possible. Get them as dry as possible. Fine weather must be chosen for mixing. The tar is to be mixed with the gravel or screenings in sufficient quantity to give each stone a little, but no more; and this can only be done by well mixing and turning it over, and doing only a small quantity at a time. Before spreading this the foundation of the path should be well rolled or rammed, to give the asphalt a solid bed. Then spread the mixture of gravel and tar to a depth or 2 or 3in. Give a good rolling and a sprinkle of some fine sand. It would be better if it were rolled occasionally until set.

Removing Large Trees.

It would certainly be a wonderful convenience if large trees could be removed from place to place with as much ease and certainty as ordinary seedlings, so that the gardener would not have to wait as long as is at present the case before getting useful trees for shade and ornament. Some trees even of good size, can be moved with some certainty of success; willows, for instance, are rather accommodating, and naturally deciduous trees are more likely subjects than evergreens. Speaking generally, however, the moving of large trees is a matter requiring considerable ingenuity and some expenditure of cash. We remember reading of a Scotch nobleman who had an avenue a mile long and over a hundred years old moved from one part of the estate to another and are still trying to believe it. The ordinary individual will find that it is not easy to remove a tree satisfactorily which is more than three inches in diameter in the trunk. Trees up to six inches in diameter can be removed but great care is necessary in order to be successful. Trees of this size have a large root area, probably covering a space 30 to 40 feet in diameter, and it is impossible to lift such trees without cutting off a large portion of their roots. The roots of a tree this size, for a diameter of eight feet at least, should be left as intact as possible, in lifting. To do this, the tree should first be dug around in a circle from four to four and a half feet from the trunk, to a depth of about two feet. The top soil can be removed down to the mass of fibres, and the ground cut away under the tree, until all roots are severed.

There are several mechanical methods by which the tree can then be lifted. The most simple is, we believe, to dig a roadway down to level of the lower roots. Back the fore carriage of a waggon with the reach pole attached against the tree, lift the pole erect against the tree and tie securely. The tree is then brought down horizontally by pulling on the top of the pole. The tree in this way is lifted from the ground and hauled to wherever wanted, and lowered into place by the same method. It is advisable to tie the branches of the tree into a compact shape, in order that they may not be injured much.

No matter what care is exercised, the check to the tree in transplanting is great. It should be done before the buds have started in the spring, and no more roots than absolutely necessary should be disturbed. The top of the tree moved should be lessened very considerably by pruning, to correspond in part with the loss of roots. Do not go to extremes in this, however, and spoil the natural shape of the tree. Some cut off a large part of the top, rendering the tree unsightly. Preserve the natural shape of the tree always as far as it is possible to do so

The Polyanthus.

Now is a good time to put in the seed of these popular plants. Thet are very hardy and adapt themselves to almost any position or soil, but prefer the following compost to grow in :—Two parts of a good garden loam, half a part of very old and well-rotted cow manure, and half a part of leaf mould, with a little sand added.

They are propagated by seed and by division of the root.

Sow the seed thinly in a box or seed pan and cover lightly. When the seedlings have formed their second leaves, prick them out into a prepared border, 6in. apart, keeping them well watered in dry weather. The only care they require is to keep them clear of weeds and slugs. It may interest some to know the characteristics of a good polyanthus. The foliage should be large and abundant, and the stem of the flower strong and stout enough to hold the truss well above the leaves. The truss should consist of at least five flowers, and the footstalks of each flower be able to support each bloom level with the rest. Each pip should be round and flat, neither inclined to cup nor reflex. The pips, that is, the flowerets, should be divided near the outermost edge into segments, each segment should be slightly indented in the centre. Each flower should have a yellow centre or eye. This yellow centre, including the tube containing theanthers, should be of the same width as the "ground" or body color, which color should be a rich, dark crimson or a bright red. Round this body color the margin or lacing should appear of a uniform width, surrounding each petal, and continuing down the centre of each to the yellow eye. The color of this margin or lacing should be uniform, whether it is sulphur, lemon color, or clear yellow.

Fruit Notes for Amateurs for June.

The nurserymen are busy, for most people want trees about ten minutes after they have decided to order them, and the farther they are away from the nurserymen the quicker they want the trees. They don't get them, so no great harm is done.

With June people who are not in a hurry should really decide what they want, make out the order, select a nurseryman from among those woo show themselves alive by advertising in these pages, and send him the order so that he will have time to excute it with justice to himself and you.

The perennial question crops up nearly every day at this season of the year :

"What size should the holes be dug for trees ?"

My reply is, it depends on the size of the roots of your tree. Dig them large enough to put in the trees without bending the roots.

"Oh, but I don't mean that. I mean how wide and deep should the holes be dug before filling in ?"

The reply is that I do not think that the practice of digging holes two by two feet or three by three feet for fruit-trees is the best. I think it much better to have the whole area of the garden ploughed and subsoiled or double dug, and then in planting make holes just large enough to take the roots of the tree. If one cannot have the whole area thus treated, do a plot four or five feet in diameter where the tree is to be planted, keeping the top soil on top or mixing it altogether. Then, as time permits, treat the rest of the ground the same way. In planting a trellis of trees double dig a strip six feet wide along the line of the trellis. The same should apply to the planting of vines in the home garden. It is really surprising how well fruit-trees and vines often thrive in Australia in unprepared soil ; but all the same, it pays to prepare the ground well.

In planting an orchard I would strongly recommend that the whole area be subsoiled except on open sandy soil.

Another question often asked is : Should I manure my trees when planting ?

This depends on the conditions. Where the soil is rich, one should certainly not give manure, for the difficulty with young trees under such conditions is to keep them back and get them to settle into the fruiting habit. In the case of poor land manure is advisable, but not in close contact with the roots. A handful, or say ½ lb. of super and half that of sulphate of potash and a sprinkling of sulphate of ammonia well mixed with the soil will help the tree wonderfully in becoming established. Then manure can be given to the remaining ground year by year as the trees grow. In the home garden to mix old manure and ashes with the soil is good, and when the trees are growing give well diluted bedroom slops now and then.

Pruning and planting are the order of the day during this and next month. Clear away all prunings as soon as possible and burn them, because they are harbors for the spores of fungi and the eggs of insects. After old trees have been pruned give them a good spraying with either lime sulphur and salt, or spray with potash and fish oil. Take 1 lb. potash lye, 3 pints fish oil, and 3 gallons soft water. Dissolve the lye in water by boiling ; add the oil and boil two hours. This will make a potash softsoap. For use use 1 lb. of soap to 6 gallons of water. A potash softsoap such as Burford's will do as well and will destroy eggs of insects, lichens, and moss, and clean and soften the bark of old trees. Mark old trees intended to be reworked, but do not cut them until the sap is rising. Prune vines and cut any cuttings required for planting, and heel them in until August. When pruning trees save any wood which may be wanted for grafting or to give to friends, and heel it in under the tree. In any spare time tie them with zinc labels, and bury in sand or earth in a cool, shady place to keep till wanted. Put in cuttings of gooseberries and red, black, and white currants ; shorten raspberry canes, cut out dead wood, and make new beds of suckers where required. Dig in superphosphate and potash round old fruit trees where needed, using from three to ten pounds of the super, and one to four of potash to the tree, according to the size and need for reinvigorating. Dig in stable manure and 2 lb. super to the rod round currants, strawberries, gooseberries, and raspberries. At the end of the month begin to make root grafts for blight-proof stocks.

Just now gardens generally are receiving the annual overhauling, and beds are being prepared for the receiving of plants and seeds. Then comes the pleasure of making a selection of the many beautiful seeds, flowers, shrubs, etc., for the forthcoming season. There are so many nurseries and other persons catering for the requirements of the horticulturist that it is often a puzzle for one to know where to make the best purchase. It is imperative to obtain first class results to secure the necessaries appertaining to the garden from a most reliable source, and with this end in view we have pleasure in recommending to our many readers the old and well-known name of Mr. Lasscock, who has for many years been one of the foremost producers of real good and genuine seeds and plants. When he commenced business as a nurseryman many of his present-day customers gave him a trial order, and so satisfied were they that they have no desire whatever to make a change ; this in itself being sufficient to satisfy the most sceptical as to the quality of the goods supplied by Mr. Lasscock. Flower seedlings (assorted) are sold in lots of 100 for 2/- ; postage being extra (6d.), whilst Petunia Grandiflora are available for a 1/- per dozen. Ferns are made a speciality, which are also procurable at very reasonable rates. Mr. Lasscock invites promoters of bazaars and fetes to communicate with him when desiring a supply of flowers, etc., for decorative purposes ; the prices for this class being at wholesale rates. Catalogues, it may be mentioned, are procurable for the asking. Mr. Lasscock's telephone number is 34, Henley Beach.

Selected Fruits

The selection of suitable varieties of fruits is a matter of some importance to the amateur who as a rule is more concerned about getting the very best quality than heavy crops of perhaps inferior fruit; he also, as a rule, wishes to secure a succession of fruits through the season. We have at various times published lists likely to be useful to such growers, supplied by Mr. Wicks and others. This year we publish two very complete collections, for which we are indebted to the kindness of Messrs. Wicks and Nobelius. They have been prepared with special reference to the requirements of the grower of fruit for home use; and will, no doubt, be appreciated by many of our readers.

MR. WICK'S LIST.

— Grape Vines. —

Cornelian, Royal Muscadine, Sweetwater, Crystal, Pedro Ximines, Black Hamburgh, Black Prince, Madresfield Court, Muscat Gordo, Muscat Hamburgh, Muscat Woods Red, Gros Colmar, Black Alicante, Red Malaga, Frontignac, Lady's Finger, Waltham Cross, Black Malaga, Royal Ascot, Sultana.

— Six Dessert Apples. —

Beauty of Bath, Williams Favourite, Gravenstein, Jonathan, Cleopatra, King David, or Rome Beauty.

— Six Kitchen Apples. —

Lord Suffield, Twenty ounce, Emperor Alexander, Prince Bismarck, Rokewood, Stone Pippin.

— Eight Pears. —

Wilder, Clapps Favourite, Williams Bon Chretien, Beurre Bosc, Glou Morceau, Laffers Seedling, Josephine de Malines, Harringtons Victoria, (Late Stewing).

— Three Quinces. —

Pine Apple, Mammoth, Smyrna.

— Three Loquats. —

Early Oval, Herds Mammoth, Chatsworth Victory.

— Six Plums. —

Early Rivers, Early New Orleans, Washington Gage, Giant, Grand Duke, Jefferson.

— Six Japanese Plums. —

Climax, Burbank, Santa Rosa, Wickson, Kelsey, October Purple.

— Twenty Peaches. —

Sneed, Highs 'Early Canada, Clatis Truniph, Hales Early, Peregrine, Carmen or Wiggins, Ruby Red, Louis Grognet, Mountain Rose, Royal George, Early Crawford, Belle of Georgia, Elberta, Red Shanghai, Kalamazoo, Finlayson's Seedling, Lady Palmerston, Osprey Improved, Salway Improved, Late Red Italian Cling.

— Eight Cherries. —

Early Purple Guigne, Early Twyford, Knights Early Black, Early Lyons. Burgdorffs Seedling Biggareau Napoleon, Black Tartarian, St. Margaret.

— Seven Apricots. —

Newcastle Early, Oullins Early, Riverside, Royal, Telton, Moorpark Robins Imperial.

MR. NOBELIUS' LIST.

The following varieties of the more commonly grown fruits have been recommended to us, at our request, by Mr. C. A. Nobelius, of the Gembrook Nurseries, as being specially desirable for home use. The descriptions are taken from his 1912 catalogue.

— Peaches. —

Sneed.—The earliest peach known; is said to ripen two weeks before "Briggs' Red May." It is a seedling from "Chinese Cling"; fruit medium size, somewhat oval in shape; colour creamy white, with rich red blush on sunny side, ripens evenly to the pit, and is of fine quality; very early.

Triumph.—The earliest yellow peach known, just after "Sneed" and with "Alexander." This variety is much esteemed in United States, where it is well known.

High's Early Canada.—A very early peach of greatest excellence, ripen same time as "Brigg's Red May," but a better bearer.

Hale's Early.—A really first - class peach in every way, and always bring the top price in the market.

Royal George. — Large, handsome, rich, mid-season, clingstone.

Kia Ora.—A seedling from "Elberta," identical in size and general appearance of the fruits with that most esteemed of all yellow - fleshed peaches, but of superior flavour; a much better cropper and hardier tree.

Shipley's Red.—This is one of the most beautiful of peaches, and very popular where known. The fruit is of large size and fine appearance, flesh white, with beautiful flush, tree vigorous and very productive; late.

Peregrine. — A distinct mid-season variety, distinguished by its good constitution and productiveness. The fruits, are large and handsome, with a brilliant skin; the flesh rich, highly flavoured, and parting readily from the stone. Raised by Mr. Rivers.

Champion (Waikato.) — A very late seedling variety, hardy and productive, fruit very large, yellow fleshed.

Surecrop. — As the name denotes, a sure and abundant cropper; ripe about middle of January; fruit large and handsome; flesh white, melting, and juicy; tree a vigorous grower and extremely hardy.

Pullar's Cling.—This very fine canning peach was raised by Mr. P. Pullar, of Ardmona. It is a very large, highly coloured clingstone peach, and preferred by the canning factories above all other sorts; it is a good grower and heavy bearer.

APRICOTS.

Sardinian.—A very early small apricot of good flavour, strong grower and a heavy bearer.

Oullin's Early Improved. — A very fine early apricot, said to be an improvement on "Ouillin's Early Peach" apricot.

Shipley. — Deep yellow, an early productive variety.

Alsace.—Large, pale orange, rich and good; medium.

Hemskirke. — Bright orange, tender, rich and juicy, and excellent bearer; medium.

Mansfield Seedling.—Very large one of the finest grown; late.

NECTARINES.

Irrewarra.—Medium or above medi-

(Continued to page 14).

General Principels of Manuring as Applied to the Fruit Trees.

It should be well known to all fruit growers and farmers that the elements which become deficient in the soil through long cultivation and the removal of crops, be they in the form of fruit, grain, or fodder, are nitrogen, potassium, and phosphorous.

Nitrogen must be in the form of nitrate before plants can take it as a food. Potassium must be changed into a soluble substance, Phosphorous is generally found with lime, as it exists in bones and phosphatic rocks which can be made soluble by sulphuric acid, and giving us the soluble superphosphate of lime, which is available to plant life. Besides these three, magnesium, calcium, (generally known as lime), iron, and sulphur are necessary for the proper growth of all plants, but as they are only required in very small quantities, the soil contains sufficient, and it is not necessary to add any of these, with perhaps the exception of lime where fruit trees are grown.

The conservative fruit - grower persist in pinning their faith to farmyard manure, and, although the greatest care has been bestowed on the pruning and tilling of the land, the trees take a rest for a year now and then, and give no yield at all.

Now-a-days, however, not even fruit trees may be allowed to rest, and if one can get an increase of crop, better quality, stronger trees by a comparatively small outlay, the chance of forging ahead in spite of competition is assured.

That yields can be gradually, permanently, and profitably increased by the use of properly-balanced manures, has now been sufficiently demonstrated by experiments and in practice. Unfortunately, very few if any, exact experiements have been carried out with fruit trees in Australia, but so carefully have these been carried out in Germany that the results achieved there should be a useful guide to fruitgrowers here, and also convince them that the judicious use of commercial fertilisers will be a profitable one.

— Quantity Required. —

On the average the various kinds of fruits require :—

Potash, 100-150 lb. to acre.

Nitrogen, 50-75 lb.

Phosphoric acid, 40-50 lb.

Lime up to 200 lb.

According to the soil in which the trees are growing.

Although lime is required in the largest proportion, the majority of soils contain sufficient. We know that very heavy clay soils benefit by the addition of lime in a caustic state.

The nitrogen can be applied in the form of expensive nitrates, but the best way to obtain nitrogen in the soil, and the least expensive is by the use of those plants to which nature has given the power of taking the nitrogen from the air, and, when fixed, the plants must be ploughed under. This is the method known as green manuring, and about which pages can be written.

— Potash. —

Potash, the most necessary, has been the most neglected of all manures ; no matter how rich the soil, its application is a very profitable one. Until lately this plant food was not considered in the same light as nitrogen and phosphates, but now it is a fact that no commercial fertiliser is complete without a good percentage of potash.

Potash plays an important part in every respect, including the growth of wood and foliage, the formation of blossom and fruit, and especially in regard to size, colour, taste, and aroma of the latter.

Potash, in Australia, is considered to exist in sufficient quantities in the soil, as the majority of the soils are of a clay texture, but this is a fallacy, as every time potash has been used in the composition of the fertiliser the results have been so much better that even in the richest clay soils there has often been found too little available potash for the immediate requirements of the crops.

As sources of potash in nature the most noteworthy and world-renowned are the Stassfurt Potash Mines in Germany. They are now the great source of the world's supply. The deposits extend over great areas, and are practically inexhaustible.

The manures which contain potash are known under the names of kainit 12½ per cent., muriate of potash 60 per cent., and sulphate of potash 52 per cent. pure potash. For sandy soils the kainit is much used, for heavier soils the others are preferred.

The other plant food, phosphoric acid, is applied as bone dust, supperphosphate, basic slag, or rock phospate. It plays an important part in fruit culture, and in the presence of potash aids in the production of early and abundant fruit. It helps the flowers to set well.

(Continued from page 11).

um size, highly coloured, of good flavour, a freestone, and very early.

Early Rivers.—Fruit of largest size, skin rich crimson on side nearest sun, light yellow, marked with red on the shaded side; flesh is tender, juicy, and very rich, with a decided "Stanwick" flavour; very early.

Hunt's Tawny. — Pale orange and deep red, rich and juicy; early.

Lees Seedling. — This magnificent nectarine was raised by Mr. Lees, of Beenak, from a peach some 20 years ago, and is still bearing beautiful fruit; the sample brought to us measured 9 ins. in circumference. It is of beautiful colour, and flavour all that could be desired. Doing so well at Beenak, being a cool district, it should be very hardy. We have no hesitation in saying that this is the best nectarine we have seen, and should become a great favourite with planters.

Goldmine.—This nectarine originated in the garden of Mr. Lundon, of Parnell, N.Z. The fruit is of an enormous size. It is a perfect freestone, the pit or stone being extremely small for so large a fruit. The flesh is a beautiful cream colour, tender, juicy, melting, and sugary, and of most delicious flavour; colour bright bronzy red; season of ripening, last week of February.

PLUMS.

Blue Rock.—Raised by Mr. Rivers, England. Large and very rich; one of the very best early dessert plums.

Agelina Burdett. — Juicy, rich, and highly flavoured, early.

Sugar Prune.—This new prune is described as far superior to the "French Prune"; tree in every respect a better grower, and will carry and mature a larger crop of fruit. The fruit is even in size and very large, averaging 13 to 15 to the pound. This variety is being planted in California by the thousand—a sufficient guarantee of its value.

Grand Duke. — Very large purple, richly flavoured, very productive; considered the best late plum grown.

Monarch.—Fruit very large; roundish oval; dark purplish blue; freestone; of excellent quality. Tree robust, and abundant bearer, trees three years from the graft bearing large crops of fine plums. A most valuable late market plum.

Greengage.—A well known and valuable plum, very distinct.

Coe's Golden Drop.—A splendid variety, large yellow; medium.

Jefferson.—Large golden yellow, juicy and highly flavoured, one of the best; medium.

Diamond. — Very dark large purple, with a blue bloom, sweet and rich, freestone, an abundant bearer; first-class certificate Royal Horticultural Society, England.

Emerald.—This plum originated here and is evidently a seedling of "Yellow Magnum Bonum," which it resembles, but is a much freer grower and heavy regular bearer. It is one of the very best for jam or canning, much superior to its supposed parent; late.

JAPANESE PLUMS.

Sharp's Early.—This variety, which originated with Mr. John Sharp, of Cambridge, N.Z., is undoubtedly the best early and most profitable Japanese plum in cultivation. Of large size and splendid appearance, and of delicious flavour; the flesh is firm, yet juicy, without bitterness at stone. The tree is hardy and an upright, symmetrical grower, and most prolific and regular cropper.

Burbank.—Large size, nearly globular in shape; colour clear cherry red, with a thin lilac bloom; flesh deep yellow, very sweet, with a peculiar and agreeable flavour; strong grower and a most wonderful bearer.

October Purple — Another of Mr. Burbank's seedlings. It is a very large, purple, heart-shaped plum, with no splashes of lighter colour; flesh amber yellow, red beneath the skin very juicy, but yet firm, sweet and of most delicious; clingstone.

Santa Rosa—Very large, purplish crimson, of first quality for dessert. This is by far the best blood plum ever introduced. Strong grower, good habit, and regular bearer.

Wickson—The fruit from the time it is half-grown until a few days before ripening is of a pearly white colour, but all at once a soft pink shading creeps over it, and in a few days it has changed to a heavy white bloom; the stone is very small and the flesh is of a fine texture, firm sugary, and delicious; one of the best.

Combination — Raised by Luther Burbank, who describes it as a Japanese plum. The trees are unusually hardy; the bark, leaves, and fruit are all unique; early, regular, and abundant bearer of large, handsome, globular fruit of uniform size; flesh straw colour, extremely sweet, with a pronounced pineapple flavour; stone small.

PEARS.

Jargonelle—A wellknown early pear.

Clapp's Favourite—An American pear of highest excellence, ripens just before "Williams' Bon Chretien;" early.

Williams' Bon Chretien (Duchess)—Large, buttery, and melting; one of the finest summer pears grown; early.

Conference—Fruit large pyriform; skin dark green and russet; flesh salmon-coloured, melting, juicy, and rich; tree robust and hardy, making a strong healthy growth. Very prolific and a valuable market sort.

Mount Vernon—Large, nearly globular; colour rich cinnamon russet; flesh juicy, melting, with a spicy vinous flavour which is peculiar and distinct from that of any other known sort; tree is a vigorous grower, and comes into bearing early; late.

Beurre Bosc—A large dessert pear of first-rate quality; medium.

Packham's Triumph—Raised by Mr. Packham, of Molong, N.S.W. This is the finest pear I ever saw. It is of beautiful large shape, and of the most perfect flavour, a good grower, early and prolific bearer; ripe in April. Has received first prize every time it has been exhibited.

Bountiful—Fine flavour, rich, melting, and aromatic; immense cropper, fruit large; autumn.

Josephine des Malines — A most delicious pear, also one of the longest keeping sorts; late.

Bezi Mai—Large size and delicious flavour, a heavy and regular bearer, commencing to bear the third and fourth year, increasing rapidly in quantity of crop; strongly recommended for home and market use; late.

Winter Cole—Melting, juicy, rich, and of exquisite flavour; a first-class pear; late.

Packham's Late — Another variety from Mr. Packham, who speaks in glowing terms of this, his latest production. Fruit fairly large; heavy

cropper, and promises to rival Triumph.

— Dessert Apples. —

Irish Peach—Good bearer and does not blight; early.

Gravenstein—A splendid apple, good flavour and colour; early.

King David—"King David" is a rich dark red apple with yellowish flesh; flavour good, juicy and rich, indeed the quality is of the very best. The apple is supposed to be a cross between Jonathan and Arkansas Black, and adds the quality of the former to the fine appearance of the latter. The King David apple has been exhibited at a number of horticultural meetings, and several years ago was awarded the premium by the Illinois State Horticultural Society for the best new apple. Tree is hardy and vigorous. This apple has now fruited, and is fully up to expectation.

Foster—This beautiful apple was raised by Mr. W. N. Foster, of Neerim South. It is of a most beautiful colour, and of very fine flavour. Coming into use in February it will fill up a gap in the market between the very early apples and "Jonathan," when good dessert apples are scarce. We feel sure it will sell before any other apple at that season, and will keep, if necessary, to middle of April. So far, the parent trees have not been affected with the woolly aphis; it is a free grower and heavy bearer. This will, no doubt, become one of our very best early export apples.

England's Glory ("Gascoigne Scarlet")—A very handsome, red-cheeked apple from Kent, free grower and a great bearer; a first-class dessert apple.

Senator—A new apple of superior merit. For rare beauty and singularly fine quality, the choice of everyone. The great show apple at the World's Fair. Just the right size to attract buyers. Tree a vigorous grower and regular bearer; flesh yellowish white and of exquisite quality.

Delicious—A strong grower, hardy and most prolific bearer, fine colour, like "Jonathan," and most exquisite flavour. One of the best late keeping apples.

Pomme de Neige—Flesh white, a fine market apple; medium.

John Sharp — A seedling from "Pomme de Neige," and is perhaps the best of Mr. H. E. Sharp's seedlings; perfectly blight-proof, enormously productive, large size, most handsome appearance; good in shape and colour, and keeps over a long season. The hardiest and best apple of its season.

Cleopatra—The best known apple, does best in dry localities.

Vegetable Garden.

— Planting Out. —

It is always good advice to plant just before a change. It is also advice which can only be partially acted upon, because the gardener must keep things going and he cannot do three days or three hours' work in one. Personally in a home garden I prefer to run the risk of having to finish planting out after rain has started rather than put out the young plants in the hot days which in our climate frequently come before a change. Still, one cannot always do as he wants, and when planting has to be done in dry weather the plan is to have the soil moist enough to take water nicely and dry enough to be crumbly. Then let the water-can follow the planting, and although the plants may droop they will not hurt.

Make successive sowings of broad beans and peas. Of peas, the seedsmen will supply many new sorts which I advise the grower to try, because one never knows when he will get a new thing specially suited to his conditions, but the good old Yorkshire Hero still remains my favourite, and whatever else I plant some of this. Transplant young onions as they are ready in early districts, and in later ones prepare the seedbeds and plant at once. It is the custom of many onion-growers in late districts to supply seed and arrange with people in early districts to grow the plants at 1s. per 1,000. Where this is not done to get early plants, seed should be sown in late districts in April, so that the plants may be well on the way before the cold weather. In the South-East of South Australia and in the Ballarat districts seed may be drilled in the fields in September, and the plants are not then transplanted. The land must be clean, and kept so. For the home garden the best plan is to buy plants from the nurserymen or seedsmen.

Seakale should now be covered to force.

Spinach, turnips, carrots, etc., must be kept weeded, and the soil of all beds should be stirred when the weather will permit.

Slugs will play havoc unless dealt with. The best remedy is to keep the whole garden clean, and provide no harbour for them. After some years of effort they trouble me very little now, but I am always on the look out, and when only a few are seen I go all over the beds, not only where damage is being done, but all over with a little air-slaked lime in the bottom of a branbag. I select a clear, calm night about 9 p.m.—all the better if moonlight—and can dust the whole garden in a short time without bending my back. A grain or two of lime dust seems to settle a slug, and I find them lying dead next morning.

For snails, I gather the big ones at night and crush them, leaving them on the spot, and next day dust a little Paris green, London purple, arsenite of lime, or white arsenic on the dead snails, and next night all snails and slugs within range will make for the bait, and so be poisoned. It is surprising how snails and slugs make for a dead fellow and feast on him by the side of tender young seedling without touching the latter.

Dig over asparagus beds, and give a mulch up to 6 inches of stable manure, to which add 3lbs. of superphosphate and 2lbs. sulphate of potash per rod of ground. Nitrogen can be added in spring in the form of sulphate of ammonia or nitrate of soda in two dressings each of 1lb. to the rod.

Dig up and store Jerusalem artichokes and prepare to plant new beds. Like Dahlias, they will stand any quantity of manure and water. Dig deeply, manure freely, using from 4 to 6 lbs. of super and 3 lbs. of sulphate of potash to the rod before planting. Top dress with nitrogenous manure in spring, as with asparagus.

Plant rhubarb. You cannot prepare the ground too well or hardly manure too heavily. Use double the quantities recommended for artichokes.

Ptepare asparagus beds if not already done. As with rhubarb, it lasts years, and must be well manured. As frequently described, the bed should be double dug with plenty of manure in the bottom and dug in. The same quantities of artificials should be given as advised for rhubarb. Salt does not appear to be really necessary if experiments count for anything, but the idea is an old one, and a pound to the rod can do no harm.

The following seeds may be sown where the ground is not too wet and sodden: — Asparagus, carrots, cress, endive, kale, leek, lettuce, mustard, nasturtim, onions, parsley, radish, rape, red and white beet, sea kale spinach, swedes, and turnips. Also broad beans and peas.

Plant out globe artichokes, asparagus roots, brocoli, cabbage, cardoons, cauliflower, chives endive, garlic, herbs, shallots, horse radish, leeks, lettuce, onions, rhubarb, seakale, tarragon, potato, onions, tree onions, Jerusalem artichokes.

Keep down the weeds, for early weeding saves work. Choose dry, warm days for this. Clean paths, and also rubbish from corners, for they harbour snails, slugs, and other pests. Get as much digging done as possible before the wet month of July.

Green manuring is as useful in a garden as in a field, except that its necessity is less on account of the humus added in the form of manure. Still, a crop of clover, peas, or tares dug in in spring is a help, and if ground is not wanted for a crop this is a very good way of using it.

Prepare hot-beds for early cucumbers, melons, tomatoes, and marrows.

Raising Early Plants in the Hot Bed.

— The Frame for a Hot Bed. —

The frames used for this purpose vary greatly is size and construction, however, the following sized frame will be found suitable for all the amateur's requirement :—20 in. high in front, by 30 in. high at the back, by 6 ft. wide from back to front, and 6 to 8 feet long to take two lights. For a smaller frame, make the width half the above, i.e., 3 ft.

— Heating Material to be Used. —

The most suitable material for forming hotbeds is stable manure. When fresh it must be laid in heaps 4 or 5ft. wide by about 3 or 4ft. high, after it has been lying for three or four days a brisk fermentation should be taking place. It will then be necessary to turn it over, taking care, however, that what was at the bottom is now at the top, and vice versa. After a few more days a second fermentation will have taken place and the strawy matter should have been decayed enough to be torn asunder with a fork. The manure is now sufficiently matured to be made up into a hotbed. For districts where they have no heavy winter frosts, the best heating material can be made by mixing one part of stable manure prepared as above an equal quantity of dried leaves ; this will give a more lasting and not so violent a fermentation.

— The Hot Bed. —

To form the hotbed, clear a space 18 in. larger all round than the frame intended to be placed on it. On this cleared space, place the prepared manure to a height of about two feet. The frame should then be placed on it, and a foot more of the manure placed on the inside, and banked round the frame on the outside. The manure will of course sink.

The inside surface of the frame should be levelled and a dressing of about six inches of potting compost or good soil placed on it. When this has been done, wait a day or two till the heat has had time to permeate through the soil. If the frame is for cucumbers, the seed should be sown direct on the compost, but if it is only intended to bring on cucumbers, tomatoes, and eggplants, etc., for transplanting out later, the seed should be sown in pots and these plunged into the soil.

The soil and air should not be warmer than about 70 degrees. Hotbeds should always be placed in a sheltered position, facing the east, and, when possible, on dry soil.

When the heat of the manure begins to flag it may be renewed by removing the outer bank of manure and substituting a fresh lot of fermenting manure.

— The Trench Hot Bed. —

If a frame is unobtainable, a very simple, cheap and effective hotbed may be made as follows :—Take out a trench in the garden, say 2ft. 6in. deep, from 2 to 4 ft. wide, and any length you may desire ; the earth that is removed should be banked up all round to prevent water running in, fill this to about 18 in. from the top of the bank with the manure prepared as I have just stated, tread it firmly down, and on it place a layer of loam about 9in. thick. The plants may be planted in this, and on top of the whole lights can be placed. This plan will be found very advantageous for market gardeners, as long trenches may inexpensively be made, and a large supply of very early cucumber raised for market.

— Inexpensive Lights. —

A very cheap light for hot-beds may be made by making a frame from light timber, 2 ft. 6 in. wide and any required length. On this nail a width of common cheap white calico, and give it a coat or two of pale varnish or oil. This in several ways is preferable to glass, cheapness, no fear of breakage ; it also prevents the hot sun from scorching the tender plants. (Dissolving ¼ lb. soap and mixing with 1 gallon of hot linseed oil and painting on the calico will do very well.—Ed.)

— Fruiting Cucumbers in a Hot-Bed.—

Cucumbers require plenty of light and a regular supply of water and a regular temperature of about 70 degrees. When they show fruit, keep pinched back to the second joint. This will induce them to put out other growths, and fruiting shoots will form in abundance. It is necessary to give a little attention to thinning in order to prevent the space becoming overcrowded. Only leave enough leaves to keep the plants healthy.

Sometimes the fruit is bitter. This is caused by the plants lagging. They should, therefore, be pushed along briskly with plenty of heat and moisture, and should not receive a check from want of either of these.

Sulphate of ammonia and nitrate of soda, ½ oz. to a gallon of water, will be found a very nice stimulant for cucumbers. Under a light, say, 6 ft. x 3 ft., two or three plants may be grown on little hillocks.

— The Management of Hot-beds. —

If the frame gets too hot, air must be carefully admitted by slightly raising the light. In any case fresh air must be admitted in the morning to allow the fumes which have collected during the night to escape. Care must be taken not to let the cold air strike the plants.

Tomatoes, cucumbers, egg-plants for planting out later should be sown in small pots, say ½ dozen seeds to each pot, and afterwards thin out to one strong, sturdy plant, and care must always be taken not to let them become weak and leggy.

Fruit Trees on Trellises for Home Gardens for Amateurs.

(Reprinted from the Garden and Field).

These notes will be open to criticism by the trained gardener familiar with and well accustomed to growing fruit trees as espaliers, cordons, fans, or in the other score of ways of almost mathematical regularity of English, French, and German home gardens. They will be equally open to the objections of the practical fruit grower if he does not at once recognise the simple fact that they are not intended for commercial operations. It is well, therefore, to at once disarm friendly critics by drawing a clear line of distinction between a fruit garden intended either solely or chiefly for home use and one planted purely for commercial purposes, i.e., with the one object of producing fruit of good market quality as economically as possible.

— Object of the Commercial Grower. —

It cannot be too clearly stated or more completely recognised—1st, that under ordinary commercial conditions the fruit grower should limit the number of varieties he grows, not only to those most suitable to his soil and climate, but also to such of those as he can profitably market; and 2nd, that in training the trees he must adopt the system that will will give the maximum of results with the minimum of labour and expense.

— Purpose of the Home Garden.—

For the home garden the first consideration is as great a variety of fruit trees as possible, in small or moderate quantity, extending over as long a fruiting period as can be arranged. Provided this object can be attained, the cost within reason is not a matter of so much moment.

For the commercial fruitgrower the initial cost of providing the trellis, followed by the time and labour needed to tie in the shoots and to keep the trees well in hand, place any system of trellised fruit trees on a large scale out of the range of practical work under ordinary conditions in Australia. In small homestead allotments or blocks, where the holder can get timber for his fences cheaply, and where he wants to set aside a small paddock for the cow and another for lucerne and other fodder, and utilise the balance of the land to the best purpose for the intense culture of fruit, herbs, and vegetables, combined with fowls, there is much to commend the trellis system for the fruit. By using netting on the trellises or some of them he can not only use the land between for vegetable crops, but he can, when the ground is free and the fruit not liable to damage, place hurdles at the ends and turn the space into fowl, duck, or chicken runs. It is quite certain that a man who knows how can get as much fruit from half an acre of trellised trees and grow as many vegetables between as he could on an acre in the ordinary way, provided he puts the same labor and manure into it.

— Meaning of Trellis. —

At first thought I would not use the term trellis in connection with these notes, because the English and Caneinental trained gardener ordinarily associates the term with a much more regular and more difficult work of training cordons, spaliers, fans, or other mathematically regular systems of trees. The word trellis is, however, defined by Webster as "A structure or form of cross-bar or lattice work used for various purposes, or for supporting trees." It does not imply any set method of training. I am, therefore, adopting the term trellised trees as carrying a generally accepted meaning in Australia of trees trained in any way regularly or irregularly on a framework of wood, wires, or netting.

— Regular Spaliers, etc. —

The training of trees as cordons, either horizontal, oblique, or upright, or as fans in their various modified forms, or as regular spaliers in various forms, is one of the perfections of the gardener's art. The work, however, is more tedious than actually difficult provided that in addition to knowing the principles of pruning and the special habits of each variety of tree, the gardener has either seen the work done or by experience has learned all the points on which complete success so greatly depends. I have often seen amateurs look at the illustrations in English, German, and French books on gardening, and express incredulity over the perfect symmetry, mathematical regularity, and often curious shapes into which the trees are trained. There need be no doubt about the genuineness of the illustrations, for if Nature does not provide a bud in the right place, the gardener puts one there, and if the shoot does not bend as it is wanted it is made to do so. Not only is it difficult to teach one of these systems on paper, but the number of them and the slow work of covering a trellis when they are adopted are further reasons for advocating the easier, though less perfect, irregular training. The plan is not as good, but it gives quicker results, and requires little, if any, more skill than the ordinary tree. After a while many will not be satisfied with it, and will then be led to adopt the better, though more difficult, regular training.

— The Plan Suggested. —

In a few sentences I suggest to the amateur that he should lay his ground so that he can run a series of good posts down the rows, stretch wires (about No. 12 will do) six inches apart, plant his trees close to the trellis, suppress all wood except that which lies close to the wires, and train that as a rough fan, rub off all shoots which start outwards, thin out the others, and otherwise prune as in the case of a standard tree. That sounds simple enough for anyone, and it is certainly unorthodox. As he proceeds he will find that he can make many improvements, and as he studies the behaviour of the trees he will desire greater regularity, and be thus led to study the proper training of fans, spaliers, and so forth.

— Distance apart of Trellises. —

The distance between the tellises and between the trees on the trellises are matters over which one might argue until to-morrow morning. The fact is they depend on conditions and circumstances. As I am writing only of the home garden, I presuppose careful cultivation, irrigation when necessary, and full attention to manuring. Now, if these things are attended to it does not matter how close the trees are, and the matter of light or shade and utilisation or otherwise of the spaces between the trellises are the only factors to be considered in deciding on the distance apart of the trellises. It just amounts to this, if you plant one tree in a rod of ground its roots in time fill the whole of the ground, and the tree grows in pro-

portion. If you want four trees on the ground the roots have only the same feeding area, and the tops the same air space, so that the four will necessarily be dwarfed. If they are close, however, there is not enough light and the trees try to run upwards and cannot thrive and bear properly.

My plan is to run the trellises north and south, and then I find that they may be as close together as they are high; but for six feet trellises I like eight feet apart as the minimum. That will give room for a vegetable bed five feet wide between. If the garden is shaded by buildings, then more room must be given; and if the owner has space available from ten to sixteen feet between the trellises is close enough. If the owner desires to cover in his trees with permanent wire netting he can make two trellises six feet apart, with twenty feet between the double trellises. A frame 10 feet wide will cover the whole in and allow two feet between the netting and each trellis on the outside, and that is enough to work in, though I would advise six inches extra.

— Distance Apart of Trees. —

The distance apart of the trees on the trellis is also a matter of adaptation, and my ideas will, I know, be criticised; but I have tested them, and know that for the object aimed at they are all right. My purpose, and I think that of the home gardener in general, is to have as great a variety as possible of the best fruits, over as long a period as possible, and not enough of any to tire the family of that sort, or more than can be used in the short time some sorts last.

Now, in peaches the amateur wants at least two dozen sorts to secure the above object. If he plants 20 feet apart on the old style he must have a quarter of an acre under peaches, and when the trees grow he will have so many that he does not know what to do with them. My plan is, thesefore, to grow a small tree of each which, when carrying a full crop, will give, six eight or ten dozen prime peaches, and I can get that on five feet of trellis six feet six high. At five feet apart my 24 sorts will occupy 120 feet of trellis. Thus on this 120 feet of fruit fence I would have peaches from the beginning of December to the end of March. All would not bear equally well each year; but it would not be too much to expect from 120 to 150 dozen a year on a well-cared-for trellis. Four short trellises 30ft. long, with six trees on each, would give the same result, and if these were 8ft. apart the minimum ground area for the 24 sorts, allowing 4ft. on the outer side of each, would be 40 by 30 feet.

This is not too much for many suburban gardens; but is too great for a cottage allotment, and the amateur must either reduce the number of varieties or place them closer together. In such a case my plan would be to plant not more than three feet apart on the trellis. On a space 20 by 30 feet I would, in fact, stick to the full number of varieties, and plant close enough to get them in the space available. Trees planted two feet apart on a trellis 6ft. 6in. high will have at least 26 square feet of bearing surface each, and, allowing three peaches to the square foot, would permit of 78, or, say six dozen on each tree carrying a good crop. How very much better is this plan than having two or three big trees giving only that number of sorts of peaches? The additional cost is the expense of the trellis, and the extra cost of trees. The trellis need not be expensive, and against it may be set the extra area of ground for growing potatoes and other vegetables. The trees are not expensive, and the cost of the greater number is counterbalanced by the fact that they will produce more fruit and of a better quality.

In advocating such close planting, I do not desire to urge the matter at all strongly. Those who have not tried the plan may well be excused for not following me fully, and I can only assure them that it is all right. If they do not care to risk two or three feet, they may feel quite safe in planting at five or six feet.

— Several Sorts of One Tree. —

There is another plan of securing a selection, and that is by planting at six or twelve feet and budding two, three, or four sorts on each tree. I have done this with capital results both on trellised trees and on the ordinary standards.

— First Year's Work. —

It is not necessary to put up the trellis the first year. All that is necessary is to carefully lay out the ground and mark where the trellis is to be. Then divide the space for the number of trees you are willing to plant and put them in, cutting each hard back to two short spurs pointing along the line

the trellis is to occupy. During the growing season suppress all the shoots which grow outwards, only allowing those to grow which are in the line of the trellis. Two shoots from each tree are enough, and, in fact, the best number to begin with. Keep the trees watered, especially after Christmas, and get a strong growth as a foundation. Tie to stakes in the line of the fence to begin the training.

— Putting up the Trellis. —

When the time comes for putting up the trellis, and for preferance this should be before the trees are planted, I would advise that the end posts be good strong ones. Any timber which will stand and any shape will do equally well except for appearance. If jarrah be used I advise 4 x 4 and nine feet long. This allows for 30 inches in the ground and 6ft. 6in. out. These end posts must be well strutted, the strut reaching to within a foot of the top and having its bottom against a peg eight or nine feet away. Do not be tempted to use short struts. For the intermediate posts lighter stuff is good enough, 3 x 2 jarrah being what I have used, and I put them from 8 to 10 feet apart. The holes are best bored beforehand. The top wire should be three inches from the top of the posts, and the bottom one nine inches or a foot from the ground. The bottom and top wires should be No. 10, but the others may be No. 12, and for short lengths of 20 feet by putting a middle wire of No. 12, the rest may be No. 14. I would stretch the bottom wire and temporarily fasten it, for this will check any tendency of the end posts to rise, for with short struts it is easy when straining the top wire, to pull the posts right out of the ground.

— The Use of Netting. —

If it be intended to combine the fruit trellis and fowl runs I would put up three wires ,one at the top, one at the bottom, and one in the middle, and stretch 6ft. by 3in. No. 18 wire netting neatly and tightly. In training the trees on the netting I would keep all the permanent wood on one side of the netting, which is very convenient for tying in the fruiting wood.

What I have written will, I think, show the amateur what is suggested as a desirable plan of growing home fruit; and also explain all that is necessary for the beginner to do now.

The Farm

Health on the Farm.

Country air and country conditions are conducive to the production of healthy men and women, always provided that too much trust is not put in them. Some farmers are careless about the surroundings of their homes, and when insanitary conditions exist, ill health is the natural consequence. Where there are open closets flies frequently carry disease. City residents have the advantages, as a rule, of good drainage, and a better system of getting rid of sewage. If the farmer will add these conditions there is no doubt but he will have little need to call in the medical man. Where water is plentiful, and the dwelling house situated on sloping ground, it is a comparatively easy matter to instal a system of sewerage. Pipes leading to a septic tank is all that is necessary. The farmer who can afford to spend a little money in rectifying the matters mentioned will effectively increase the standard of health and personal comfort of all residing in his home.

The Farmer of To-day.

The farmer of to-day is a very different type to the one of half a century ago. There are many reasons for the change, but chief among them is the fact that the standard of intelligence has been raised proportionately higher than probably in any other calling. Agricultural and other colleges have sent young men back to the land to introduce new methods, and to induce their elders to abandon old systems not in keeping with present-day conditions. The application of cold storage, the invention of the harvester, the oil engine, and the various other machines and implements designed by the skill and ingenuity of the engineer and mechanic have revolutionised farming. Agricultural papers have also played an important part in the education of the modern farmer. They are his professional literature, and cover all phases of farming. Another thing that has been invaluable in helping on the farmer is the railway. It enables him to see more of the country and the city. He is no longer in the hands of the local storekeeper, and the days of barter are gone. He is thoroughly acquainted with the latest market quotations, and there is not now much hope of the dishonest dealer taking him down. When we visit the agricultural shows the change that has taken place in his methods is most observable. His exhibits now represent quality rather than quantity. The handsome cows give place to the one that yields the most and the richest milk, the biggest potato is supplanted by the best potato, the big pig is ousted by the best bacon pig, and so right along the whole line of the numerous products of the farm. The more we study the present-day farmer and his methods, the more apparent it is that he has become to a large extent a business man.

Diseases of Sheep.

— By H. Leeney, M.R.C.V.S. —

Sheepbreeders in general probably give but little credit to the veterinary profession for recent improvements in the treatment of ovine diseases. A great deal that has been written might be summed up in the cautic words of a reviewer, who said of a book, 'It contains much that is new, and much that is true, and that which is new is not true, and that which is true is not new.' The sheepbreeder is like others, inasmuch as he does not like being preached at, and the attitude of the breeder is, truth to tell, the correct one for the veterinarian; since nearly all the breeders' troubles are the outcome of climatic or dietetic conditions, which the doctor cannot cure, but follows the now universal practice of preventive medicine, in pressing upon clients the desirability in avoiding first causes, or anticipating the consequences of adverse conditions, which latter may be unavoidable. The diseases of sheep are not mysterious; they are all pretty well understood—their means of communication, their progress, duration, and sequelae; but the nature of the animal, the conditions under which he must live to be worth keeping, are such as do not lend themselves to individual doctoring, such as the horse or dog. The maladies of the sheep, whether in Australia, in the Argentine, or in the homeland, are much the same, except that in this matter, as in so many others, Australia suffers less.

— Parasitic Host. —

A considerable army of scientists are engaged in all civilised countries in investigating the diseases of animals, and from the Bureau of Agriculture of the United States, and from the New Zealand experts employed by the Government, we continue to receive valuable reports, all pointing in the direction of good management as a means of prevention of disease, and with but little in the way of recommendations for the treatment of it when established. It is only when some specially favourable season develops immense numbers of parasites that the sheep owners can be prevailed upon to wage a war which should be perpetual. If the parasitic diseases were eliminated the sheep would know but little trouble. If united and determined, unrelenting effort were made, we could reduce them almost to nil. It is too often forgotten that the determining causes of parasitism are not simply environmental, but constitutional, and more or less interdependent. It is not to be supposed that because a lamb is weakly in constitution he will actually develop, say, bronchial worms without the seed. It is an old theory, long since exploded, that dirt and poverty "breed" certain maladies—they do so in a broad sense, but there must be the seed, or nothing in the animal or vegetable creation can be reproduced, unless it yield "seed after his kind, whose seed is in itself upon the earth." After muddling about for centuries, and thinking ourselves too clever to accept the above simple declaration, we have had to come to it after all, and our scientific leaders are now agreed that "it was so." Before a sheep can become the host of a parasite it must in some form have been present in the water or pasture, which latter includes the air as a medium for winged creatures Butchers, and all who have had to do with the dressing of carcases, will testify to the constant or nearly constant presence of some form of parasitic life in sheep, and because the majority "die well" and appear to have suffered no ill effects, a familiarity breeds contempt for this danger, as for other risks. It is doubtless a part of nature's economy that sheep should carry certain guests, and that no great harm results, so long as fair balance is maintained, but for reasons at one time regarded as inscrutable, but now pretty well known, there is a veritable invasion at irregularly recurring intervals, and the breeder scores a loss where he should have made profit. It is not enough that we should strive against these pests when by their numbers we see serious damage in front of us; we should endeavour to get rid of the seed. The few mature worms of this year are capable of spreading disaster next year, since "the vilest things do fastest propagate."

— Favourable Conditions for Certain Worms. —

The most favourable condition for certain classes of worms is the stagnant pool, with low forms of vegetable life in it. It circumstances permit, then, we shall not water the flock from such sources. One of the chief reasons for the greater losses sustained by Australian sheepbreeders is due to the necessity of drinking from water holes polluted during the long droughts—polluted by the sheep themselves, as well as other creatures.

Constitutional vigor on the part of the animal seems to confer more or less immunity from attack, and the power of resistance when attacked. On swamps, for instance, where wethers will live fairly well, lambs or hoggets will fade away, the victims of parasites which they cannot throw off. Older animals will succumb when poor. There is what is known as physiological degeneration, and such condition invites invasion. In the healthy and vigorous the blood contains more iron and salt, both of which are inimical to many forms of parasites. Our fore-fathers discovered the utility of these two substances before they had analysed the blood, and they are recommended in the oldest works extant as a "cure" for this that, and the other, having its origin in parasitism.

The long-woolled and heavy breeds suffer most from parasitic invasion, not alone because they are reared upon lowlands which suit the generation of worms, but because they have to grow wool as well as make growth at the same time. This has been noted in New Zealand especially by that eminent veterinary adviser to the Government, Mr. J. A. Gilruth, M.R.C.V.S.

With regard to drugs, recent experiments performed by Mr. Gilruth in New Zealand would seriously shake our faith in their vermicide action, were it not that experience at home has shown that a course of medicine, of which even large single doses produce no appreciable effect, have, after a time, a marked influence upon the subjects to which they are administered. Going away from sheep for illustration of my meaning, I would point to the use of so-called "alternatives" for horses and cattle. Not Finlay Dunn, with his lifelong study of veterinary therapeutics, could tell us how they act, but agrees with other observers that "they alter for the better the condition of the system," and that they "counteract or annihilate disease, though their modus operandi is not yet definitely

settled." So it is with worm remedies, or at least some of them, with sheep. Although living worms taken from the sheep and immersed in these substances in about the same amount of fluid as would be found in the living subject do not quickly die or seem much to mind their position, it is known by experience that a course of such substances as iron and salt has the effect of rendering the host undesirable as a dwelling, while the absorption of the drugs into the system of the sheep provides the blood with materials in which it was deficient, and so adds to the vigor of the animal, and enables it to overcome the debilitating influence of parasites.

The proportion of powdered sulphate of iron to dried salt should be that of one of the former in a hundred of the latter, more concentrated doses inducing constipation in ordinary seasons, but permissible in wet weather, and on scouring pastures.

Celebrated Danish Butter.

"I found in visiting the creameries of Denmark that they all followed practically the same method of making. They skim a very thin cream, containing 18 to 20 per cent. fat, which is immediately pasteurised by heating to a temperature of 190 to 194 degrees Fahrenheit. It is then quickly cooled to a temperature of 50, where it is held for about two hours. The cream is then raised to a temperature of 60 to 65 degrees, when about 5 or 10 per cent. starter is added. There is nothing peculiar about this part of the work. They do not develop a very high per cent. of acid, which accounts for their mild-flavored butter.

"The temperature at churning at most of the places visited was 58 to 60 degrees. This high temperature has a tendency to make the butter a trifle soft. As soon as it was churned into very fine grains, as fine as clover seed, a lot of ice-cold water was run into the churn, about one-third of the bulk of the cream. Then the churning was continued a short time and the granules became larger. The sudden chilling of the fat at this stage undoubtedly gives the dry, meally appearance so characteristic of the Danish butter.

"As soon as churning is completed the butter is removed with a sieve to a wooden box, where it is plunged into water at a temperature of 60 degrees. It is then placed on a table worked and salted at the rate of one half ounce to every pound of butter, when the worker is put in motion and the butter is worked about three-quarters of a minute, or just enough to incorporate the salt.

"The object of placing the butter in water is to hold it at a uniform temperature until the salt is practically dissolved. It is then placed on the worker again and worked about one-half minute or until the loose moisture is pressed out and the butter assumes a waxy condition.

"The little working butter receives enables it to hold a high per cent. of water. It has been demonstrated at our school that every revolution of a combined churn will expel moisture at the rate of about 3 per cent. with butter at a mean temperature.

"The average water content of the Danish butter in 1892 was 14.54, or about 2½ per cent. higher than the butter made in Canada and the United States. In other words, the Dane makes two and a half pounds more butter from every 100 pounds of butter-fat than we do. This little country, which has an area of something like 15,000 square miles and a population of about 2,000,000, exported 175,000,000 pounds of butter to the English market, and their soil is no better than yours. In fact, when I first entered Denmark with its somewhat undulated surface and its beech forests, I was reminded very much of the province of Ontario.

"One factor that enables Denmark to produce a uniform product is that the creamery business is practically run on the whole-milk-system. Their method of scoring butter every fourteen days has been a great aid to them in meeting the requirements of the English market.

"They have no set time for a maker to exhibit butter. They have what might be termed a call system. They wire a creamery to send a keg of butter to Copenhagen or some other point the day of shipment. This butter is held at about the same temperature that it will meet in transit to the English market, and scored about the same time, the rest of the butter arrives in England, so if there is any fault to be found with the butter on arrival their experts will know the reason by examining the butter left at home, and they will be able to point out the defects at home and suggest remedies. The result is a uniform quality which is so much desired by the English merchant.—Professor McKay.

The Breeding, Selection and Care of the Dairy Cow.

Methods of breeding domesticated cattle for the purposes to which they are especially adapted, have been practised from the earlier times. The oldest writers on cattle breeding give directions for the breeding and improvement of the dairy cow, and their precepts are often repeated by modern authorities as being incapable of improvement at the present day. — Acquired Characteristics from

Parents. —

It has long been known that the characteristics of the parents are transmitted to their offspring, and the expression "Like produces like" is often used. There are, however, many apparent exceptions to this law; but a close examination into all the facts relating to hereditary transmission will prove that it is not only constant in its action, but extends to every feature of the organization. The uniformity observed in the various breeds of cattle is the result of the inheritance of the characters that adapt them to the conditions under which they were originated and developed. Some of the most striking illustrations of this form of heredity are to be found in the development of the improved breeds of dairy cattle.

Every farmer, in attempting to breed for the improvement of his herd, ought to bear in mind that hereditary power of the animal, that is, the power of transmitting its qualities to its offspring, is constantly cumulative; provided the animal has been bred on correct lines. For example, the general law that "Like produces like," is undoubtedly correct upon general principles; the difficulty is in a want of knowledge as to the inherited qualities and characteristics of the two animals which are brought together. They may appear to the naked eye to be alike, and yet there may be, and often are, very marked differences in yielding capacity and other such-like qualities. If they in turn have been bred from parents with "like" qualities and are alike in all their peculiarities, the offspring will not only be like the parents, but will have their characteristics more strongly marked; that is, the essential characteristics in which the parents are alike will be intensified in the offspring—the power of transmitting its peculiar qualities will become stronger and stronger. But, on the other hand, if the parents are not alike, and there are any essential differences between the male and females, instead of the power of heredity becoming stronger and stronger with every successive generation, it will become weaker and very greatly reducing what is wanted.

Dairy farmers are frequently heard to say that they care nothing about pedigree; they desire to see the bull, and then they can tell whether they want to breed from him or not. There can be no greater mistake made, for the reason that this hereditary power is latent—is hidden in the system. It cannot be detected by the eye, it cannot be detected by any known law, except that of hereditary influence, in other words, pedigree. If the farmer knows positively the peculiar characteristics of all the ancestors of the animals he is about to breed from, then he can tell with some degree of certainty what the result is likely to be. A pedigree in itself may not be worth the paper it is written upon, unless you know the characters of the ancestry recorded in it; that is, unless you know that in each case the male and female in each successive generation have been alike in their good qualities.

In breeding, special regard should be paid to the outline structure, or good points of the bull to be used in the herd. He should have a small, well set head, large docile eye, rounded ribs, straight legs, small bones, and sound internal organs. The breeder should bear in mind that the hereditary power already referred to, which is so valuable and important and on which the whole improvement must depend, is hidden, and cannot be detected by the eye. That shows the value of a good pedigree ought to be studied on both sides, and in that way and in that way alone, can we breed with any degree of certainty in regard to the result. There is no doubt, in my judgment, that the male parent, whether stallion, boar, ram, or bull, exercises a greater influence on the offspring than the mother does. It is well known to the breeders of Aryshire cattle that the sire has an important influence upon the form and functional activity of the udder, and the position and false teats or nipples of the bull are believed to furnish an indication of the milking qualities he will be likely to transmit. It is of the utmost importance that well bred, well formed sires, be employed on our dairy herds.

Amongst dairymen, one often hears the expression, "The bull is half the herd." This is literally true and it is a great pity that it is not more fully recognised. Of the qualities transmitted to the calf the bull furnishes half. The cow influences the character of but one calf a year, the bull passes

on his characteristics to many calves, to all calves of an ordinary sized herd. When he is selected, half the character of all the calves is determined. In a herd of 30 cows his influence is as much as that of the whole number of cows put together. If the bull selected is descended from parents possessed with a pure pedigree and heavy milking capabilities, he will naturally be superior to the cows he is mated with in the ordinary grade dairy herd of cows, and the characteristics he transmits to the calves will be of more value and higher quality than those that come from the dam's side; in this sense also the bull will be more than half the herd. If the bull is kept with the same cows several years, each year he starts out a generation of calves, more than half of whose qualities were transmitted by him. But his successor of similar type and quality, mated to those improved heifer calves, carries the improvement of the herd still further, and eliminates defects that have been derived from the dam's side. From generation to generation the succession of improved sires introduced into dairy herds goes on increasing and intensifying the improvement of the cows. It is therefore only reasonable to expect that the bull used, may thus, within a few years and at slight expense, completely transform a dairy herd of cows and more than double its profit.

I have heard farmers ascribe the principal influence to the bull, whilst others consider it is chiefly due to the female, and there are not wanting illustrations that appear to support this theory. The freaks of nature in these respects are certainly very curious and farmers are often more struck by a remarkable exception than by the rule, and are disposed to found their theories accordingly. Facts, however, appear rather to support an opposite doctrine. For example, the offspring of the male ass and the mare resembles the former more than the latter. The long ears, spare muscular development, narrow feet, and sluggish action, are almost equal peculiarities of the mule and the ass, and strongly attest the former's origin. Incidentally, it is also surprising, too, what large colts small mares will breed when begotten by horses of great size. Pony mares will thus rear stout cobs and galloways, and well bred mares, about 15 hands high, will throw carriage horses of good size, if bred to a powerful stallion. The improvement that can be effected by means of introducing a Shorthorn or Hereford bull in a herd of ordinary cows, is strikingly shown. In sheep, the influence of the ram is, if possible, still more clearly illustrated; the cross between the Lincoln or Leicester ram and the ordinary grade greatly resembles the ram in appearance, size, and fattening qualities.

In animals we do not notice so accurately the features of the face, but are attracted far more by the resemblance offered by the configuration of the body, and thus we are more impressed with the greater likeness the offspring bears to the sire. Stop the indiscriminate breeding of all kinds and any kind of breeds of cattle in one herd. Select a breed best adapted to the conditions which exist, and get a sire of the best dairy breeding qualities to be obtained regardless of cost. Use him for at least three seasons and breed the heifer calves back to a sire of the same family blood and as far removed from kinship as possible, thereby freshening the herd with new blood, without weakening it. There is no surer way to produce scrubbers than to mix beef and milk breeds and get antagonistic forces and purposes into close contact. While it is quite true that a common cow can be bred up and made far better, the continued improvement is only accomplished by keeping to one line of breeding—that of pure-bred sires of the same breed every time. Never waste time by first trying one breed and then another. This unsatisfactory method is very noticeable in the dairy herds throughout the State. In a herd of cows, nine out of ten times, as herds go, one will find traces of nearly all the breeds in existence, and this majority of cows is the class that produces less than 300 gallons of milk each a year, when by proper care and breeding they should produce between 500 and 600 gallons.

A man will not pay high and fancy prices for mixed breeds of any kind of stock—it is the pure breeds that are wanted first. One often hears the argument used, that a cross makes the better animal. Is it so, or is the cross of two pure breeds a compromise? Granted that the cross is better the first time; what is it the next? If breeding is continued on these lines the result will be a repetition of the old story. Two breeds crossed with two distinct purposes—one beneficent, for ever giving; the other miserly, for ever storing up, only to give back what is eaten in beef. The dual-purpose cow from a theoretical point of view sounds good. It is very well to say that we want to breed a cow that will give a large flow of milk, and at the same time produce a calf, which, if it happens to be a steer, will turn out to be a fattener of as good a quality as though it had been dropped by a good beef cow. The trouble in most cases is that nearly all farmers like the look of a nice, fat cow better than they do one of a strong dairy type, which is usually not a model of beauty and symmetry. It is quite true that there are occasionally individuals in these breeds that are fair milkers; sometimes even excellent milkers are found. But after all they are few in number, and the worst of it all is that even though you do get a bull from a good milk strain, that bull is most likely to produce calves totally unsuited for the dairy. What else can one expect when breeding on these lines? Have not these cows and bulls been bred for beef, generation after generation? Are they not valued because of their square, beefy type? The great trouble with most dairymen is that they do not know what their cows yield. If they would keep a record of the yeilds of their cows and test the same, they would soon learn that dairy blood counts. If you were to ask even the strongest advocate of the general purpose cow what constitutes the standard, or ask him to minutely describe to you what to look for when buying such an animal, it is safe to say he could not do so, for he does not know himself. There is no standard to go by and the whole thing resolves itself into luck.

(To be continued).

Order and Neatness on the Farm.

A good many farmers do not regard neatness, order and regularity as factors in the production of their annual incomes. They regard the work and money expended in maintaining a presentable appearance unnecessary, and consequently the farm home and surroundings are disorderly and often dirty. We have carefully noted in our travels through Australia and other parts of the world that it is a rare thing for the neat and orderly farmer to be unsuccessful. A lady writer says: "To be neat and orderly about the house shows an economical, saving mind in the housekeeper." The same thing applies to the farm. The man who has a place for everything and keeps things in their place saves time and money. His farm is a great contrast to that of the man with his old waggons and machines lying about without cover, doors off their hinges, rubbish in the front yard, fences broken down, and a general unkempt appearance about everything. If you speak to such a man he generally has a mournful story to tell of cattle, or sheep, or crops, that do not thrive, and it is easy to see that he is making the great mistake, "It don't pay to keep things up." Such a man often farms a large area, but does it in such a slovenly fashion that the results are not correspondingly large. The other kind of man is observant and systematic, and the work he undertakes he does in the best possible style, rather than doing a large amount indifferently—a policy that pays the best. Dairy farming especially calls for constant care, good order, and irreproachable cleanliness in all things appertaining to it. Such habits add to the health of himself, his family, and herd, and uplift his standing in the community.—"Exchange."

The Smallest Horses in the World.

Mr. David Buffurn, in the American "Country Gentleman" of 27th January (says "The Live Stock Journal"), gives an interesting account of the breeding of the Lliani ponies, the smallest horses in the world. In 1901, after spending some time in the West Indies, he returned to the United States, bringing seven of the tiny animals from Lliani, a little island lying off the west coast of Hayti, intending to breed them on his farm at Narrangansett Bay. The ponies attracted much attention in the United States, and an official report of the Rhode Island State Board of Agriculture gives the following account of heights and weights, the former being from the ground to the top of the withers: — Toussaint, black stallion, 19 in., 48 lbs.; Dessalines, cream-coloured stallion, 19 in., 49½ lbs.; Grisette, cream-coloured mare, 18 in., 46 lbs.; Josephine, black mare, 19½ in., 50 lbs.; Marie, bay mare, 18½ in., 47 lbs.; Faustin, bay stallion, 19 in., 39 lbs.; Fifi, chestnut mare, 15½ in., 48 lb. In the same year Mr. Buffurn and his partner (Captain W. Jones) purchased the island from the Government of Hayti. They gave up the idea of breeding the ponies in the United States, and confined their operations to Lliani. They found it possible to diminish the very small size of the ponies. Hippolyte, a six-year-old stallion, was a fraction under 17 in. in height last spring, and weighed only 36 lbs. He was stolen, and the way in which a hunt was made for him with success makes an amusing story. He was found in New York being conveyed through a street by a negro, who was carrying the little animal with one hand in a perforated wooden box, to which a handle had been affixed. Several other attempts, some successful, were made by gangs of thieves, landing in the island, to steal the ponies. In one case a man was detected making off for the shore with a mare under one arm and her foal in a portmanteau. Speculations as to the origin of the ponies, Mr. Buffurn states, were discussed in American papers when he brought his first lot of them into the United States.—Queensland Agricultural Journal.

Salt for Sheep.

There exists in most farmers' minds a dimly conceived idea that salt is good for sheep, and so at irregular intervals tuey supply it to them in varying quantities; but probably few of them really understand the effect this condiment has upon the digestion nor the actual need that exists for it.

It is not an accidental craving that causes sheep to so eagerly devour salt, but rather is it a real, physical want that demands satisfaction. Hydrochloric acid is one of the chief constituents of the gastric juices of the stomach that play so active a part in digestion, and it is to help supply the chlorine of this acid that salt is necessary. It will be noticed that when sheep have not had salt for a long time, they eat it in simply enormous quantities. This is because the supply of chlorine has become depleted, and requires replenishing. So, it is not simply to lend variety or improve the flavour of food that salt should be given, but rather to supply chlorine for the gastric juices.

Another reason why salt is useful to sheep is because it increases their thirst, and causes them to drink water in sufficient quantities to carry on the normal functions of the body. If foods are eaten, and only a small amount of water drunk, compaction often occurs in the digestive tract, and trouble or loss ensues. Moreover, when the water supply is small, the assimilated food is not so readily carried to different parts of the body and distributed to the tissues.

Particularly when sheep are on grass and crops do they need salt, because these crops contain potassium salts. Potassium has a greater affinity for chlorine than hydrogen. Hence, unless plenty of chlorine is supplied to the body, the potassium takes a portion of that which otherwise would combine to form hydrochloric acid.

Either coarse ground or rock salt may be used for feeding, as preferred. There is probably more waste in connection with the ground salt, but licking the rock salt sometimes makes the sheeps' mouths and tongues sore. If coarse salt is used, a tight trough, covered with a little roof as a protection from the rain, should be provided.

The average ewe requires from three to five pounds of salt a year, the variation depending largely upon the amount of natural salts contained in the feed given. This would mean that she should have from two to three pounds during the summer. It would be well to weigh out the amount that the whole flock should have during the summer upon this basis, then there will be no danger of giving too little.

It is a mistake to give sheep salt only occasionally, and in large quantities, for under these conditions their appetites are so sharpened for it that they eat too much. If is is kept constantly before them when they can eat it at will, they will eat what is necessary for the carrying on of bodily functions, and will not take too much at once.

Timber Planting for Shelter.

The provision of warmth by the planting of shelter belts of timber is one of the most profitable improvements of a property on which stock is carried. No class of land improvement exceeds in value that of tree planting, and its value for shelter in winter, and shade in summer is best appreciated by those who have taken practical steps to secure its advantages, also supplies of timber for fencing and firewood are provided by the thinnings, while the additional value of the property from an ornamental point of view is a further aspect.

Choosing a Farm.

— Area. —

This must be in accordance with our means, but there is no need to be anxious for a large block if the land be good, for a little good land intelligently worked will give better returns for less labor than when one's efforts are spread over a large holding. One acre of good land will require no more labor to produce a crop than will poor land, while the return may be up to three times as great.

— Situation. —

Not too far from the railway station, with good roads, or at any rate situated so that the roads when properly attended to will be good. It would be an advantage to choose land not absolutely flat and level, thus ensuring drainage, but at the same time with not too much slope, else too large a portion of the rainfall is lost by running off, and all haulage operations, even ploughing, etc., are considerably increased.

— Aspect. —

The land should slope east or north-east, with hills on the south and west if possible to offer protection from heavy winds, which do far more harm than heavy frosts. Frequently we complain of the biting cold, when it is due almost entirely to the severity of the wind, as may be proved by seeking shelter from its fury. This matter of shelter is more overlooked than most things that conduce to profitable management of a farm.

— Trees as Shelter. —

If patches of timber are present to offer generous shade from the summer sun so much the better, as they pay for standing room many times over.

Water is a necessity. Creeks are good, but ascertain if there is underground water at reasonable depths. I like springs and wells, though I must confess only too often springs are converted into puddle holes by neglect to keep stock from them and conveying the water to a trough for drinking purposes. Water! Water! water! Always look out for water. In a favored locality a plentiful supply costs nothing and means much.

— Improvements. —

Now, as to the improvements. I would not give a straw for these as usually found. If good and where wanted, well and good; if not, why, a man can effect these in time just to suit his own notions. Make the most of what there is, and plan to have everything fit in harmoniously afterwards—always build so that one part will dovetail with another to give the most suitable and economical arrangement of buildings, ect. As for the state of the land as regards undergrowth, etc.—well, if somewhat in the rough we will get it more than correspondingly cheap, for a pound spent on clearing usually means £1 10/- or more of a rise in the market value.

— Weeds. —

As for weeds (so that they are not "noxious" ones) one need hardly trouble—if a good heavy growth of weeds can be produced the land is in good heart to produce good crops. My old dad used to tell a story of an old-country farmer who advised his son, when seeking a farm, not to make a deal unless he could find weeds strong enough to tie his horse to, and there was a good deal of wisdom in the advice, as such a farm must necessarily be in good heart, while the neglect shown by the growth of such weeds would probably reduce the market value of the farm—make a good farm a cheap one.

— The Homestead. —

Having secured a good farm, I think the most important point to be considered is the position of the homestead and the arranging of the necessary paddocks and buildings. First and foremost, I say, let the homestead be as nearly as possible in the centre of the paddock, granting a suitable site as regards drainage, water supply, etc., can be obtained; indeed, I would keep this question of the homestead in my mind before choosing the farm. It is quite a common thing to see farm houses situated on the roadside or on one corner of the paddock, and the stock are never to be found near there when wanted—they are always at the back end, and a great deal of a man's lifetime is wasted going to the back-end of the paddock. With a homestead in the centre of a farm the back-end is only half-way at furthest.

In the early pioneering days (I remember them well), when we saw only one human being beside the boundary rider in the space of three months, settling by a roadside, was reasonable enough, but not now. With all classes of stock change of paddock is a great advantage—a necessity, indeed, to successful management. This can be most economically managed

when a homestead is in the centre of a farm.

A fire-acre square surrounds the homestead. When the time can be spared for sub-division fencing, fences radiate in four directions and at the smallest expense the farm is subdivided into four paddocks all convenient to the back door, so that no time is lost having to go away down to shut the No. 2 gate.

Choosing a farm means choosing a home, which is as important as choosing a wife. Unfortunately, only too often both are chosen without the careful consideration that should be given to such an important matter as the choosing a helpmate, companion, and coworker for life, or of a home that may be one's almost from the cradle to the grave. A suitable wife, properly appreciated, makes a man, a suitable home makes a man, his wife and the bairns.

When Milk Was Unknown.

Milk is supposed to be indispensable in sustaining human life, especially in the infant stage. Butter, notwithstanding its present abnormal price, is found on almost every table three times a day; yet one could make shift to do without it, however much it might be missed. There are substitutes, little known, possibly, in this country, but many and varied in Great Britain. So much so that a very stringent Act of Parliament was called into existence to deal with these numerous substitutes. To mention only one, oleomargarine, which served a useful purpose in the absence of the real article; and doubtless where ignorance was bliss met with due appreciation. Even without this, however, the human race could get along very well. Youngsters could make healthy progress on beef and bacon dripping, while the old folks could rest content with various things along the same lines. But milk, and fresh milk at that, is a real need; and milk means cows. The concentrated and condensed substitutes, unsweetened and sweetened, desiccated, and administered in a powdered form, are only useful in that they supply temporary needs. The best of each soon palls and is pronounced sickly or insipid. From a revenue point of view the individual producer would suffer immensely if milk and butter were suddenly abolished. A great gap would also appear in the agricultural returns of the State, and every household would raise a plaintive cry.

Yet there was a time, only a few centuries ago, when milk and butter were wholly unknown to the vast population of the two Americas, North and South. In one of these, at least, farmers pride themselves at the present time in knowing how to turn out both products better than anybody else. This degree of pride may be a national failing; but whether it is so or not it is ever excusable. From north to south, and from east to west, not a cow was to be found on either continent some years ago. Neither was there any other milk-producing animal in the domestic state. There were no mares, no she camels, no nanny-goats, nor even a female elephant to be relied upon to produce the lacteal fluid. From the times of the earliest mound-builders, during all the thousands of years that preceded the discovery of these new worlds, the population knew not milk, neither had it knowledge of any form of butter. It was a milkless age. When the baby of that period cried, its milk must come from the mother. Doubtless it would be as well if the modern infants could draw substance from that fount alone. Medical men hint at such things occasionally. There was no resort to the bottle and no condensed milk in the days of the ancient Aztec.

Pizarro and his piratical crew fared no better in the land of the Incas. They found plenty of people there, and an abundance of food, but no horses, no camels, and no cows. There were wild sheep in abundance, but they were encouraged only for the sake of their wool and flesh, and not for the purpose of milking. Even the llama, the only beast of burden found anywhere on the American Continents, while useful as a carrier, does not appear to have been used for dairy purposes. It is possible that the conquerors, who came from a cow country, would have given a lot of the gold that they stole in exchange for some milk and butter; but these articles were not to be had. In lieu of them the rascally Pizarro and his gang of desperadoes contented themselves with "milking" the poor Peruvians of all their other property. When they had completed the process, the "cow" was so well stripped that starvation set in, and destroyed half the population. In the course of time the invaders brought over a lot of their long-horned cattle, from which they obtained milk and butter, in the language of the ancient historian and of the modern politician, "just like mother used to make."

The nomadic tribes that roamed over North America were as badly off as the people farther south. The buffalo cow certainly gave milk; but the Indians never mastered the art of milking; in other words, they never domesticated any animal except the dog, and consequently knew nothing of milk and butter. The Indian babies were suckled at the beast, varied with intervals of sucking their thumbs, but grew to man's estate without any help from female quadrupeds. Nevertheless, they produced sane, powerful men, physically perfect, capable of all kinds of endurance, strong, agile, and athletic. The obvious lesson from all this is that milk, while a mighty good thing, is not as indispensable as many would have one believe. One sees that a large part of the world's population did without it for centuries, and yet, so far as the animal man is concerned, turned out some of the finest specimens ever seen on the earth.

Many of man's supposedly necessary possessions are purely artificial. He could get along without them. Vegetarians are proving to us that man can live and thrive without any animal food at all. Immense numbers of people in Asia live almost altogether on rice; and hordes of savages in the South Seas for generations throve on fruits, such as the banana and the cocoanut. If, prior to the introduction of the domestic pig, the Polynesian varied his diet, it was on the special occasion of a banquet where "long pig," or a human being was served up. Unless scientists are at fault our remote ancestors had nothing but nuts and the fruits of the earth to live on, and had not at that early stage developed the right kind of teeth to tear meat. Notwithstanding all this, few of our readers will find it easy to realize how they could get along without milk and its products, or without the cow and all that the cow stands for.—Elder's Review.

Readers! **Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.**

Some Principles of Stock Breeding.

Though the breeding of animals as one of the chief items in agricultural pursuits has occupied the attention of no inconsiderable portion of mankind for many thousands of years, history is usually silent on the methods adopted by our far distant forefathers for the improvement of their flocks and herds.

— Jacob as a Stock Breeder. —

We have, of course, the story of Laban's work for his own good, and as it is one of the earliest circumstantial accounts, it is worth recalling. It should be remembered, however, that the subject is one which is still hotly debated among those most qualified to form opinions.

The story is to be found in Genesis 30, and is a fine example of trickery matched with trickery, or, shall we say, of the biter being bit. Laban having, in the dark, palmed off bleary eyed Leah on Jacob in place of the comely Raechel, for whom he had served seven years, gave the latter for another seven years work. When it came to adjusting wages Jacob proposed that he should have for his hire all the speckled and spotted progeny of the flocks and herds in his charge after all the existing speckled and spotted ones had been separated out.

The narrative then says: "And Jacob took him rods of fresh poplar and of the almond and of the plane tree, peeled white strakes in them and made the white appear in the rods. And he set the rods which he had peeled over against the flocks in the gutters in the watering trough where the flocks came to drink; and they conceived when they came to drink. And the flocks conceived before the rods, and the flocks brought forth ringstraked, speckled and spotted. And Jacob separated the lambs and set the faces of the flocks towards the ringstraked and all the black in the flock of Laban; and he put his own droves apart and put them not unto Laban's flock. And it came to pass that whensoever the stronger of the flock did conceive, that Jacob laid the rods before the eyes of the flock in the gutters, that they might conceive among the rods; but when the flock were feeble, he put them not in, so the feeble were Laban's and the stronger Jacob's. And the man increased exceedingly, etc."

— Robert Bakewell. —

To England and an Englishman, Robert Bakewell, belongs the credit of having first reduced, or, had I not better say, elevated animal breeding to a science. He it was who first deduced, and then by systematic experiment and research, confirmed the existence of many of the great principles which since his day have to an ever increasing extent governed the practice of workers in this most fascinating and most profitable side of agricultural work.

Not only may it be claimed with justice that the correct breeding of animals is a science, but it may, I think, with equal truth, be called an art. Thus, it is a science because its fundamental principles are exact, based on fixed laws, and operating within definite limits. It is an art because within those limits the trained skill, instinctive knowledge, and preceptive faculties of man operate. First in bowing where necessary to Nature's laws, again meeting and over-coming the difficulties she is ever ready to place in the way of too rapid or unwise development (for be it known Dame Nature is essentially conservative) by artificially bringing into operation other laws. Finally by directing her forces and moulding them to his will he ensures that the finished product will stand out a monument to Nature's progress and man's genius.

One of the great charms of the animal breeding is that it is not of necessity confined to any one class or set of conditions, for the workman who breeds a winning strain of terriers or bantams may know as much in his own line, and enjoy as keenly the possession of his knowledge, as typified in the animals he has produced, as any Angas in his Shorthorns or a Murray in his Merinos. The fact that the monetary gain is vastly

lifferent does not affect the prin-
iple or the pleasure one whit.

— Much yet to be Learned. —

Animal breeding is a broad and comprehensive question, and one on which there is still much to be earned in the always operating principle of cause and effect. On he one hand many causes are till obscure. On the other it is often difficult to trace back a iven result to its original source, ut there are, nevertheless, many efinite principles which the animal breeder may take hold of with he assurance that their applica-ion will not lead him astray. There will be difficulties and dis-ppointments, no doubt, and vholly unexpected set-backs, but hrough and above it all those who persevere will come to recog-ise the inexorable working of na-ural law, and he will see that to ucceed he must fall in line. He vill find, too, that he cannot urry Nature too much, for she is or ever, he only for to-day. She infinite, he is strictly limited. ut she is kind to those who trust er and crowns the work of those who follow her teachings with as-ured success.

— Some Principles. —

In applying these teachings to y subject of animal breeding, the rst great truth we learn is that ike produces Like. Not each me, certainly not every time or ll the time, so far as our limited nowledge can tell, but there is a ersistent recurrence of likeness of fspring to parent or ancestor.

This tendency is affected by so lany and so different natural uses, though often apparently or ctually artificial, that the abso-te importance of recognising the orking of this law is sometimes verlooked. Yet were it not for is great underlying principle of eproduction the work of the reeder would be absolute chance, r it is the one sure foundation hich his future success must de-end.

— A Breeder Must have a Standard. —

Following this as a rule which very breeder must follow, is the ing for himself some standard perfection, either real or ima-ned, to the reaching of which his hole energies must be devoted. or instance, not only must he now exactly what sort of a cow e is aiming at. His standard may ant to breed a cow, but he must be right or it may be wrong, but he must keep it always before him, and each step must be one nearer his ideal. If this is not done, though he may always keep cows, he will never become a cow breeder.

— Selection. —

Another rule from which there must be no departure is that of selection and breeding only from the best—that is, the one which most nearly approaches his ideal. It may be rather a poor cow, but let it be the best he has, remembering that he who starts even with poor stock, but with knowledge and aptitude for the work, will soon pass another who begins with greater advantages but lacks knowledge, for knowledge acquired or instinctive wins in the cow byre just as surely as at the Universities.

— The Individual the Key to Breed. —

Yet another great rule in breeding, seemingly a little contradictory to the previous one, though not really so, and particularly applicable to the man who starts with a long purse. It is this, Breed only from individuals which closely approach the ideal type. This is a short cut to victory. The man who can practise it will, I grant, get there sooner; but will he learn as much on the journey?

— A Principle of Mating. —

Again a rule which the breeder must always keep before him is that of mating two animals so that the faults of the one may be counteracted by the other. Thus both may, indeed, surely will, have defects, but see to it that they are not the same on each side. Let the male be strong where the female is weak. To mate otherwise would be to exaggerate the trouble in the offspring.

— Purity of Blood. —

A point often overlooked by many who do devote some thought to the mating of the animals on the farm is the importance of purity of blood in the male used. It is, I think, a curious fact—at least I know I have frequently observed—that it is most often those who do exercise care in other points who neglect this, yet in their case it would be the finishing touch. The coping stone, in fact, of the work they have done. On the other hand, many a careless and utterly indifferent breeder

(Continued on page 32).

Age of Animals.

Scientist tell us that the duration of the lives of the lower animals differs from that of man's lives in being far more uniform.

While human beings die at all ages between infancy and senility, among the lower animals, on the contrary, all individuals of the same species live to very nearly the same age, unless killed by violence.

A bear rarely exceeds twenty years; a dog lives twenty years; a fox fourteen or sixteen; lions are long lived, one is known to have lived to the age of seventy. The average age of cats is fifteen years; a squirrel and hare seven or eight years; rabbits live to be about seven. Elephants have been known to live to the great age of 400 years.

Pigs have been known to live to the age of thirty years; the rhinoceros to twenty. A horse has been known to live to the age of sixty-two, but averages twenty-five or thirty; camels sometimes live to the age of 100; stags are long lived; sheep seldom exceed the age of ten; cows live about fifteen years.

The dolphin and porpoise attain the age of thirty. It is said that whales live 1,000 years. An eagle died at Vienna at the age of 104 years; ravens frequently reach the age of 100 years; swans live 300 years; a tortoise has been known to live 107 years.—Exchange.

Paints and Painting.

Of the various classes of paints—as tar, varnish or resin, and oil paints—the last are the most extensively used, and in the majority of cases afford the best protection.

The wearing quality of a paint, and its protecting power, are due more to the pigment than to the oil. With a pigment ground in oil, the finer the pigment the longer it will wear; but it will dry more slowly. A layer of paint is about three times as thick as a layer of linseed oil; hence, for this and other reasons a paint affords better protection than oil.

Paint should be applied only to a clean and dry surface. Moisture under a paint causes it to blister when exposed to the sun; also moisture between coats has the same effect. On old painted surfaces the paint should be removed or rubbed down smooth before applying new paint. In some cases a careful removal of blisters is sufficient, but the surface should be free from dust and dirt. In case of the removal of paint by a solution of caustic alkali, the surface must be thoroughly washed to remove traces of alkali, and carefully dried, before painting.

Iron or steel surfaces should be carefully cleaned, by means of a steel wire brush and emery paper, to insure the removal of all rust before painting.

Paint generally should be applied with a good round brush and well rubbed out. The rubbing out serves to remove any bubbles of air, also the film of air found on all surfaces and it insures a thorough incorporation of the paint with the surface, thus affording better protection. The rusting of farm machinery is no doubt largely due to the fact that it is "painted" by the dipping process. Air bubbles causing openings in the paint film, moisture enters and rusting begins; also, the paint not being well brushed out, is easily removed mechanically.

In the case of ready-mixed paints, it is generally found that the pigment has largely settled to the bottom of the can. In preparing the paint for use, the liquid portion—oil and dryer—is poured off a clean can, the pigment and the small amount of the oil remaining in the bottom are thoroughly worked up and mixed by means of a strong, short stick. When the pigment is thoroughly loosened from bottom and sides of the can, the fluid portion removed is added from time to time until the paint is uniformly mixed. Paint should be kept in cans having air-tight covers. After using, brushes should be cleaned with benzine or turpentine, and should not be left in the paint.

Milk from Beans.

The Japanese do not rely entirely upon the animal kingdom as a source of milk supply, but manufacture milk from soya beans in large quantities. The process of making this milk, which is said to be very nutritious, is described as follows:—"The beans are first of all softened by soaking, and are then pressed and boiled in water. The resultant liquid is exactly similar to cow's milk in appearance, but is entirely different in composition. The soya bean milk contains 92.5 per cent. of water, 3.02 per cent. albuminoid, 2.13 per cent. fat, 0.03 per cent. fibre, 1.18 per cent. non-nitrogenous substances, and 0.41 per cent. ash. Some sugar and a little phosphate of potassium are added in order to prevent the elimination of albumen, and then the moisture is boiled down till a substance like condensed milk is obtained. This condensed vegetable milk is of a yellowish colour, and has a very pleasant taste hardly to be distinguished from real cow's milk."

The Life of Seeds.

A seed is really a bud naturally detachable from its parent plant, a bud in which the germ or embryo of a young plant is stored in the smallest possible dimensions. It really represents a resting stage on life's journey, a period at which our garden and farm crops generally are reduced to their smallest bulk, and in the most convenient form for transit or storage until harvest again comes round. Seeds by the million, of kinds many and varied, exist or lie dormant below the earth's surface, latent if deep buried, but capable of germination whenever excavations of any kind bring them within the genial influence of sun heat and light and air and moisture. When shafts of mines, or deep artesian or other wells, or railway tunnels and cuttings are made, the earth brought to the surface and there exposed often produces crops of weeds or other plants not known to exist in the locality before, and the inference is that these seeds have become buried and inert in the deep bosom of the great earth mother, and live there silently awaiting a resurrection to sunlight and warmth once more. This, apart from the possibility of light seeds being wind-blown on to the new soil from the immediate vicinity. That many seeds will and really do lie dormant for many years in the earth deep enough to be insensible to sunlight and heat is pretty well known, and that many seeds will withstand all the climatic vagaries of climate both in the tropical and arctic zones is, of course, apparent, but that they were capable, moreover, of withstanding artificially-produced temperatures much lower than those of the arctic regions, and much higher than those of the dry and desert regions lying around the Red Sea, is a matter of more recent research and experiment.

Professor Dewar subjected various seeds to the excessively low temperature of liquid hydrogen, and these seeds, after being tested in the Royal Gardens at Kew by Sir W. T. Thiselton-Dyer, were found in many cases to have their protoplasmic vitality almost unimpaired, and this after passing through temperatures much colder than any that are possible under the worst natural climatic conditions at the present time. This inherent power of withstanding extreme cold may have enabled so many plants to exist all through the great glacial epoch; their seeds slept on, deep buried, but latent life was there. Atropos, even, had not the power of cutting that life line of extreme tenacity, as it existed in the tiny seeds ripened and buried ere the ice age began, and which were again to spring into life and freshness and beauty as the ice caps and glaciers melted slowly away from above them. It is the same when we come to consider the other extreme of heat instead of cold, for one has only to look at the crop of seedlings that come up, as it were, spontaneously after a forest, or a prairie, or a heath fire, to see that an enormous number of the seeds buried more or less deeply in the earth have escaped, and rapidly avail themselves of the light and moisture and free space that succeed the fires. Everyone must have noted how speedily the new growth of grass, gorse, or furze, broom and heather, etc., reoccupies the old areas of recent fires. No doubt millions of seeds are actually consumed and absolutely destroyed in forest and jungle or in heath fires, but quite a sufficient proportion escapes annihilation, and continues the prevalent tree and shrub growth or native flora. In Singapore, as also in Borneo, we have seen even plants reputed delicate and difficult to grow in British hothouses, such as Nepenthes (pitcher plant) and some terrestrial and other orchids and palms, spring up amongst the lallang or other grasses that succeed forest and jungle fires. It may be thought that the nepenthes and orchid seeds, being light and readily wind borne, may have blown on to the burnt areas after the surface earth cooled down, but this argument could scarcely apply to the heavy seeds of palms and leguminose and other plants that also are amongst the first new vegetation to appear. So that even under natural conditions we may assume that seeds of many plants, both of the tropical and temperate zones, are now and then, and under certain conditions, able to withstand the action of fire. Darwin long ago pointed out that the earth had a curious power of closing over anything deposited on its surface area, this being in a great measure due to the burying or upheaval power of earth worms in temperate lands, and also of the mould-building ants or termites in warm countries, and it may be that the tendency of heat being to rise upwards, the effect of jungle fires, etc., may not penetrate very deeply into the ground, and that the buried seeds for ages lie dormant and safe below the fire line, so as to be ready to "replenish the earth" whenever it is left bare.

Dr. Henry H. Dixon, a distinguished physicist of Trinity College, Dublin, has recently taken up the question of seed vitality from heated and dry end of the scale of extremes, and his experiments are alluded to in Nature of July 11, where he describes the results obtained from seeds carefully dried in a chamber exposed to the fumes of sulphuric acid, or desiccated in an oven or thermostat. From his actual trials Dr. Dixon concludes that, in most cases, the dried seeds can resist very high temperatures, just as Professor Dewar and Sir W. Thiselton-Dyer found that they could resist very low ones. Seeds of Medicago, for example, after an hour's exposure in a temperature of 110 C., and another hour of 121 C., showed a germinating power of 10 per cent. Seeds thus dried and heated, however, are not only slow of germination (retarded), but the growth after germination is extremely slow, so that life is considerably weakened by extremes of drought and heat, although not altogether destroyed, as one would have a priori imagined would have been the case. Apart from the power of resisting extremes of heat and of cold, dry seeds in many cases also possess a wonderful power of resisting poisonous vapours, but in this they would appear to owe their immunity not so much to the inherent vitality of the living protoplasm of the embryo as to the impervious density of their seed coats or testae, this being proved by the fact that if the seed coats are ruptured or perforated previously to their being treated by poisonous vapours or liquids the seeds lose the power of germination. The whole question of seed vitality is an important one, and especially to seedsmen and all who cultivate farm, field, and garden crops, and it is very encouraging to find that seeds are so hard to destroy by either heat or by cold. A cool and equal dry temperature is best for preserving the vitality of seeds generally, any alternations of heat, moisture and drought frequently proving fatal, as under such conditions germination is started and then drought soon kills the embryo plants, as in the "malting" of grain for brewing purposes.—Field.

(Continued from page 29).

is a stickler for a pure bull; probably he then thinks he has done all that is necessary, and his interest ends there. But for the benefit of the man who does much, yet neglects this, let us look a little closely into what this purity of blood really means.

Purity of blood is only of value when it goes with individual excellence (one should qualify this a little, perhaps, but let it stand for the present), and I should be the last to advocate the blind use of an animal only because it was purely bred. It is what goes with pure breeding which makes its value in the head of a herd. Purity of race is secured by a more or less lengthy descent from animals of similar type, shape, and characteristics. In the course of time this particular type becomes fixed. In other words, purity of blood of the same strain when mated will throw offspring in the exact image of themselves. They are, in fact, prepotent. Now, when that type and shape and those characteristics are what is wanted, we see what an immense power for good is this inherited tendency in an animal to beget offspring like himself, especially when mated with one not so prepotent. Thus a pure bull in whose blood the correct type, shape, and characteristics are concentrated will, when mated with a herd of cows of no fixed blood lines, impress his own individuality on every calf dropped. For in each case we have on the one hand a fixed tendency in one direction, whilst in the other partner in the union there are no predominating but often antagonistic influences.

To Get a Pig Into a Waggon.

It is not the easiest thing in the world to get a pig into a waggon. A loading "rack" attached to the conveyance will save a lot of trouble (says the Farmer and Grazier). Such a "rack" can easily be made. Let the bed-piece consist of two pine boards 6in. wide by 9ft. long. These are fastened together by three cross-pieces of the same material of proper length, so that the "bed" will just fit in between the sides of the wagon box. A floor is laid on these cross-pieces on which short strips of lath are nailed to prevent the pigs from slipping. At one end the sides are notched to fit on the bottom of the waggon box. There are two stakes on each side, by which the sides are fastened on. The "rack" is more like an ordinary top box, with the exception that each side is composed of three narrow boards about 4in. apart, and nailed to three cleats (the two end cleats to be on the inside and the middle one on the outside of the rack), and projecting down the side of the waggon box. For unloading the pigs nothing but the bed-piece need be used, which, being light, may be easily thrown on and taken with the waggon.

— Pig Styes. —

Light should be admitted into all pig sties. Sunlight is needed to dry out the interiors of the houses when they become damp. It is a disease-killer, and the pig needs the presence of a disease-killer about as badly as any other animal. It is an easy matter to put in a few panes of glass, even in a house that is of small dimensions. In the large houses it is absolutely necessary, and more so in winter. The heat that comes from the sun is the best kind of heat, because it has in it electrical rays, which are not usually taken into consideration.

Farmers' Experiments.

Field experiments made by farmers in their own fields are not intended to solve problems connected with the general practice of agriculture, but to afford information as to the special needs of the farmer's own fields, and to show in how far he can increase his profit or economise by the addition or omission of certain fertilising ingredients.

It is the province of scientific institutions to investigate general principles. It is the province of the individual farmer to ascertain by trials on his own fields to what extent the results obtained by the institutions are applicable to his farm.

Every farmer should make such experiments, because the results will afford guidance to be obtained so accurately in no other way. It is by such means that he can find out what kinds and quantities of the different fertilising ingredients will yield the best results; in what constituents he can economise; and in what he should be more liberal.

Before the introduction of artificial manures the treatment of the soil was a simple matter; but now that the farmer has at his disposal a variety of artificials, and is recommended to expend considerable sums of money on them, it is essential that he should ascertain by actual experiment and calculation how far the expenditure will result in an increased profit. He should examine this question just as carefully as any other manufacturer before incurring outlay for increased machinery and plant calculates how far the expenditure will be remunerative.

It may be thought that an analysis of the soil, or the results obtained at an agricultural scientific institution, afford scientific guidance, but it is not so. Chemical analysis, useful as it may be, will not show conclusively the quantity of available plant food in the soil: the results obtained at the institution: also useful in a general way and admirable as signposts showing the direction, do not indicate with precision the special requirements of the farmer's land; nothing can reveal this need but a trial on the spot. —Mark Lane Express.

Cultivating Lucerne.

"The foremost method of cultivating alfalfa is with the disk harrow, one of the most excellent farm implements ever invented. Alfalfa sown in the fall is almost invariably helped by disking the following spring, with the disks set quite straight, so as not to cut the crowns but to split them. It is usually well to follow this disking with a tooth harrow, with its teeth set straight. Occasionally in a dry summer the disk may be used to great advantage after the second, and possibly the third, cutting also. Many disk their alfalfa fields every spring, and some after each cutting; others do so only once in every two or three years, owing to weather conditions and the conditions of the alfalfa. In some instances the common harrow is used instead of a disk.

"The disking has several beneficial effects. It splits and spreads the crowns, causing more and consequently finer stems to spring up, affording hay of the most delightful quality easily cured; it loosens the soil about the crowns, conserves moisture and destroys the weeds. There need be no fear of killing the plants if the dicks and the harrow teeth are set straight and weighed or otherwise adjusted to give direct and steady forward movement. As an implement for the cultivation and invigoration of an alfalfa field the disk harrow has no equal, and its frequent use is by those who know it best deemed quite indispensable."—From Coburn's "The Book of Alfalfa."

Prevention of Disease.

By S. S. Cameron, M.R.C.V.S. in Victorian Journal of Agriculture.

Just as there are certain circumstances and conditions of body and of environment which tend to the acquirement of disease, so there are certain factors which make for healthfulness, and which, when exerted to the full, have powerful influence in warding off attacks of disease or in mitigating their severity. By the general and continuous practice of hygienic principles and the adoption of methods of adequate sanitary efficiency both the avoidance of predisposing causes and the mitigation of the more marked 'effects of exciting causes may be compassed.

For the prevention of outbreaks of specific disease, and of their spread means special to the disease are adopted. The character of these means will depend largely on an understanding of the nature of the disease, its incubative period, its mode of spread, and other like special features, and will moreover be conditioned in some cases by local circumstances and commercial considerations. They will also depend on the existence of special legislative enactments, and machinery and facilities for administering such. To some extent preventive measures will be indicated in later chapters, when the diseases to which they apply are being dealt with. In this place it will suffice to give short consideration to some of the more important of the many factors which make for general good health and for lessened susceptibility to diseasa.

— Breeding. —

Care in the selection and mating of breeding stock is necessary for the prevention of those diseases which are generally regarded as hereditary. The breeding from tuberculous cows may, under circumstances specially arranged, be so conditioned that little, if any, risk of the disease being transmitted is run; but under ordinary circumstances the risk of transmission in breeding from tuberculous sires and dams is a large one, and should be unhesitatingly avoided.

Horses affected with any of the following diseases or unsoundnesses should not be used for breeding purposes :—Nasal disease (osteoporosis), rheumatism, ricketts, roaring, whistling, broken-wind, grease, navicular disease, ringbone, bone spavin, bog spavin, thoroughpin, curb, and cataract. It would be well, too, if breeding from stock possessing radical defects of conformation was avoided—such as, particularly, those with calf-knees, bent legs, round gummy joints, flat feet with weak "corny" heels, narrow contracted heels and muley feet, sickle hocks, knuckled fetlocks and long weak pasterns; those "tied in" below the knee and hock, and those which "brush" or "speedy cut."

The supineness of Austlalian horse breeders generally, and particularly those who have the management of stock shows and stallion parades, in regard to the question of transmissible unsoundness in breeding stack, is remarkable. It is *apparently begotten of that carelessness in the selection of sires and dams which was engendered in the days when horse flesh was a drug in the market. But in these present days, when ordinary sizeable three or four-year-old draught colts commonly fetch £40 to £50, and harness horses are proportionately valuable, it is surely little short of a scandal that prizes are commonly awarded at agricultural shows, which are supposed to exist for the improvement of agriculture and stock, to sound and unsound breeding stock indiscriminately. Instances are not wanting, even at the show of the leading agricultural society in this State, in which the blue ribbon has been carried off by an obviously unsound animal, and at some of the provincial shows the awarding of prizes to veritable "crocks" is an occurrence so common as to excite little or no comment. For the judges seem to be guided by make and shape and suitability only, in the case of breeding stock, the existence of, say, a spavin or roaring claims consideration under the heading of suitability for the purpose for which the exhibit is intended—viz., the begetting of sound and saleable progeny. At any rate, when, as hapened at a leading provincial show in Victoria a short time back, of six horse awarded prizes in two breeding classes, four of them were palpably unsound, the spavin of the first prize thoroughbred and the curb of the first prize draught being distinctly discernible from the ring side, the judges cannot reasonably be acquitted of the charge of abetting in the deception of the breeders of the districts in which the ticketed champions are to be used. Equally culpable was the judge at a recent "National" show, who awarded first to a pronounced roarer, whose "music" could be distinctly heard while he was undergoing the not-too-wind-distressing ordeal of being judged. Such happenings are almost incredible, and are calculated to excite amongst thoughful men grave apprehension for the future of the horse industry. Ask Indian buyers of extensive experience, or those who were intrusted with the buying of horses for South Africa during the war,as to the numbers of otherwise useful horses that are rejected on account of transmitted unsoundness, and say: Is it not time that prizes, by the gaining of which the average small breeder judges of the merits of the animal, should be awarded only to animals worthy of the distinction in all respects?

— Feeding. —

The most essential attribute of food, in so far as it may be a factor in the maintenance of health, is that it should be sound. Sour milk in the production of diarrhoea in calves, musty hay inducing broken wind in horses, and fermented grains giving rise to indigestion and hoven in cattle, are familiar instances of the ill effects of unsound or decomposing food.

Next to soundness comes the necessity for regularity in feeding and that the food should be in proper proportion, both as regards quantity and quality. By the observance of regular hours for feeding animals, and regular and not too prolonged intervals between feeding, a rhythmical action of the digestive organs is engendered, which induces more perfect digestion and makes for disease- resiting strength.

As a general rule, for all herbivorous animals, the advice to feed little and

often is good, in that it is in accord with the method of feeding in a state of nature. When such practice is adopted with stabled animals, there is less likelihood of any food being left over, and consequently the tendency to stomach and bowel troubles resulting from the ingestion at next feeding time of soured or fermented food is minimized. Soiled food should always be removed after feeding, and should never be mixed with fresh feed. Complete mastication of the food is necessary to perfect digestion, and in the case of animals with the habit of "bolting" their food it is advantageous to let it be coarser than usual so that chewing and grinding may be assured.

— Watering. —

Very diverse views are held as to the proper time at which animals should be allowed to drink—whether before or after feeding. The most natural plan is to always have water accessible to the animal when in the stable. If this is done, as much water will be taken as is required, and no more, and it will be taken when required, and at no other time. The opinion that water should be given in limited quantities—limited, too, according to the judgment of man—is an error. Animals in health seldom or never take more than they require. It is conceivable that, after long, enforced abstinence, or after profuse perspiration, they require—and take —more than is good for them to take at one drinking—a quantity, indeed which will, by its volume of coolness produce stomach or intestinal spasm (colic). In such circumstances it is advisable to interrupt the drinking for a time, or to take the "chill off the water by warming it slightly, or by adding a little warm water to it It is well that water should be withheld for some time prior to the imposing of violent exercise or work Racehorses, for example, should not be to allow a long drink, if it is desired is not during the three or four hours preceding a race. Perhaps the only other time when it is advisable to allow a long dring, if it is desired by the animal, is immediately after feeding, when the fluid, passing rapidly theough the stomach towards its natural receptacle—(the caecum, or blind gut, or water gut)—is likely to carry with it into the small intestines some of the stomach contents which are still crude and harsh and not in a sufficiently degested state to pass on, and which, therefore set up colic, or even inflammation of the bowels (enteritis). For similar reasons, if water is not kept continuously within reach, in which case, as previously stated, as much as will do harm, will never be taken, the watering should always be done before feeding.

The obviousness of the necessity that drinking water for animals should be pure and wholesome has been previously indicated, when the part it plays in the causation of disease was dealt with. To insure this, it is often desirable that purification by filtering through natural or artificially-constructed filter-beds, or by precipitating, or some other method of purifying should be resorted to; and the expense and trouble of establishing such precautions will be amply repaid by the assurance which they afford of the continued health and vigour of the stock. On farms where the water supply consists only of water-holes, which become foul and foetid from pollution by animal discharges, water troughs supplied by windmills should be provided. The objection is sometimes raised that, where water-holes and swampy patches are numerous, it is of no use providing drinking troughs, as stock will not make use of them; but it will be found on trial that stock will always go naturally to clean water. In point of fact, cattle may be frequently observed to refuse, or drink but sparingly of, contaminated water. Thty may be seen to go to a foul and slimy water-hole, stir the water by wading, then smell it, and drink a little, or wade out without drinking at all. That their thirst is not assuaged is evidenced by the fact that they may be seen to return and repeat the performance time and again. In any case, the fencing off of the water-holes or swamps would be a distinctly profitable undertaking if only as a safeguard against fluke and other such parasites.

— Management. —

So far as the prevention of disease concerned, good management includes the continuous provision for housed animals of comfortable quarters and bedding, an adequate supply and interchange of fresh, wholesome air without the occurrence of draughts, suitable clothing, efficient grooming and cleaning, and regular exercise or work in moderation; and for animals in the paddock, in addition to an adequate supply of food and water, shelter, or protection by rugs from wind, rain, and insects and shade from the sun. It will be found, by careful observations over a longer or shorter period of time, that the measure of health or freedom from disease of any stud of animals is in ratio to the amount of care exercised in regard to these items of management.

There are certain times at which extra care in the management of stock is necessary and profitable. Young stock, particularly foals and calves, should be kept growing during their first winter. It is the worst possible policy to let them get low in condition, either from shortness of food or lack of protection from the weather An ideal winter paddock for young stock should contain a straw stack, whereby both shelter and a oicking of dry food is afforded. A check received during the first year is seldom made up for, and it will go hard with under conditioned youngsters if anything in the nature of contagious disease gets amongst them. Weaning time is also a critical period. Foals should be gradually accustomed to take a little good, hard feed for some time before they are removed from their dams, otherwise the sudden loss of milk will be severely felt.

— Cleaniness. —

Although, perhaps strictly, this should have been included along with management, cleanliness is so much a thing apart in importance from all other factors in the prevention of disease that the strong emphasis of separate consideration is incumbent.

Cleanliness means, simply and essentially, the absence of germs and the lack of means for their multiplication and development. Disease caused by germs make little headway where cleanliness in all things prevails. Take swine fever, essentially a germ disease, and mark the general experience that, amongst filthily-kept pigs, with rotten food to eat, foul fluids to drink, reeking air to breathe and a stinking stye with a filthy floor to lie in, the disease spreads like wildfire, and is proportionately fatal; whilst amongst paddocked pigs, or those attended to wholesomely, and fed on uncontaminated food, in frequently flushed styes, it appears to be almost non-contagious. Similarly abortion in cattle, strangles in horses, and distemper in dogs, the associated fatalities and "catchingness" are always decreasingly proportionate to the cleanliness of the surroundings.

There is not much more to be said—in fact, nothing more need be said, if the fact has been impressed that cleanliness in all things connected with animals—in their surroundings, their feeding and watering, their housing and paddocking, when working and when at rest—is above and beyond all things the most important factor in the preservation of health and the vigorous resistance of disease, and that it is the essential feature in the subjugation of the spread of infectious and contagious diseases, and of the germs which cause them.

(To be continued).

Rugging Cows.

Year after year writers in the agricultural press advocate the rugging of cows, not, it must be confessed, with a very large measure of success, at least as for the smaller dairy man and private owners are concerned. It should, however, be remembered, that these worthy scribes do not offer the advice merely because they consider that a rugged cow is more ornamental than an unrugged animal. No! There is a sound scientific reason at the back of it. Broadly speaking, food consumed by the cow serves two purposes. It maintains its vital forces, and the surplus goes to milk. Obviously then if more than is necessary is used for the the former purpose the less there will be available for the latter. Now the greatest drain there is upon the energy of a healthy cow comes from cold and wet weather, and if the animal can to some extent be protected it will be readily shown in her outout. Commodious and artificially heated stables are unnecessary with us, but the provision of a rug during inclement weather has been proved to be a commercially profitable investment. We do not, of course, refer to the traversity of rugging, examples of which we sometimes see in our park lands, when torn and rain soaked bran bags may be noticed hanging from the more prominent points of or trailing behind some unhappy beast. No doubt the owners mean well; their execution is, unfortunately, disastrous, for such rugging is injurious rather than helpful. No! the rug we mean is light, waterproof, warm, but easily handled, durable, yet not costly. Such a rug, in fact, as supplied by Messrs. Holden & Frost, Grenfell Street. We have spoken of scientific reasons as backing up the theory of rugging, but to the average dairyman, however, the fact that the owners of some of the largest milking herds of the Commoning the adoption of this practice will be more convincing. Many interesting records of profit followwealth have adopted the practice have from time to time been published, and no doubt any maker or seller would be able to show highly satisfactory testimonials from users who they have supplied. Two and two make four, not once, but for all time; similarly and with equal surety a comfortable cow will be a profitable cow, not once, but every time, and in cold weather rugging goes a long way towards comfort. In any case the matter is one which merits the attention of every owner whether he milks one, ten, or a hundred cows.

Farm Notes.

Dairying is profitable, if you do the right kind of dairying.

Of all branches of live stock husbandry, dairying gives the largest return for feed consumed.

Do not work a young horse long before having shoes put on him; the wearing away of too much of the horn of the foot is to be avoided.

Drainage is one of the prime necessities of the piggery; the floor should slope to a drain.

Heavy feeding will not make a good milker of one not naturally of the milking breed.

Don't keep too many sheep on the farm, and do not keep any if you cannot have the best. After you have a real flock keep on weeding out.

Poultry Notes.

Club for Plymouth Rocks.

Some weeks ago Mr. A. J. Todd, of Franklin, suggested in the press that a club to further the interest of the Plymouth Rock was desirable, and expressed his wish to hear from anyone interested in the subject. Matters have moved ahead a little, and this month a meeting of a few breeders interested in the breed took place with the result that Messrs. Fox, Chandler, Hayward, and Fitch, have been appointed to further the movement. It is hoped that a larger meeting, one, in fact, attended by all interested in the breed, will be held at the forthcoming show. There can be no doubt that Specialist Clubs run on common sense lines have, in the past done, and are still doing, much, to maintain the breeds they represent in popular favor. As an instance one need only mention the S.A. Malay Club, which includes practically all breeders of this variety. The more recently formed Wyandotte Club, is doing good work, and the increase in the number of Bantams bred and exhibited, is more or less due to the somewhat spasmodic efforts of the Bantam Club.

With regard to the Plymouth Rock enterprise, it occurs to us, that the number of breeders specially interested, is so small as to be a serious handicap to the foundation of a successful society. We believe that more success could be attained if they asked the Orpington men to join them. It will be remembered that a suggestion for forming an Orpington Club has been more than once mooted, but, so far, without result. If the "Plymouths" and the "Orpingtons," however, were to join forces, we have no doubt that a live club representative of the breeds could be formed. The matter is in the hands of breeders themselves, and it will depend on the interest they take in the matter, whether Mr. Todd's suggestion results in something definitely progressive, or another failure being added to the list of well meant endeavours.

Poultry and Kennel Club Show.

Fanciers are reminded that this show will be held on the 28th and 29th of this month. The schedule to hand reminds us of one alteration which has taken place since last year, for Mr. Joseph Hill, who has for so many years been in charge of the arrangements, has found that the pressure of other work does not permit his continuing to occupy the position of secretary. Whilst exhibitors will regret losing him, for the genial Joseph had come to be looked upon as a permanent institution, they may be assured that in the hands of Mr. Winchester the running of the show and other arrangements connected therewith, will leave nothing to be desired. It is to be hoped that this year will see a satisfactory addition to the entry list, and that visitors make their numbers a little more conspicuously apparent, than has been the case of late years. The secretary and committee are, we know, endeavouring to add to the list of attractions.

Messrs. Hobbs, W. A. E. Smith, George Duncan and Pitman, will do the bulk of the judging, and in their capable hands exhibitors will have every confidence. We hear reports of unusually good stock in many breeders' yards, and the cream of it, which will be penned at this show, will certainly be worth a visit. Many poultry keepers who would, we know, derive pleasure and profit from getting in touch with what is being done on the fancy side, religiously keep away from our shows. Why this is so, is difficult to determine, for if one is keeping and breeding poultry at all, it is surely worth while to go for the best possible and to visit such a show, with its 1,000 entries, must be helpful. The classification is, as usual, liberal, and requests for added classes have been met wherever possible. Fanciers can best express their appreciation of the work of the committee by attending the show and bringing their friends with them.

A Deputation.

When the poultry expert had a little difference of opinion with the committee of the Poultry and Kennell Club some time ago, a rude person remarked that the latter would probably be sorry for it. Possibly such a person would connect the incident with the recent refusal of the Government to continue their usual subsidy to the Society. Far be it from us, however, to be so unpleasant! In consequence of this refusal, a deputation, consisting of the committee and a few friends, waited on the Minister of Agriculture to ask him to reconsider his decision. It was speedily apparent that Mr. Pascoe knew very little about the matter, but he apologized so charmingly for his greater mistakes, and minor inaccuracies, that one could not help wishing that his knowledge of the subject were equal to the excellence of his intention. The facts of the case, having been placed before the Minister, who promised to consider the matter, in the light of his added knowledge, the deputation hopefully departed. As the original subsidy, already once reduced, was only £15, one is a little surprised that any attempt should be made to further handicap the Club. As a matter of fact, as the deputation pointed out, they were asking for rather less than nothing, because the Society pay £5 10/- rent to the Government, and fares and freight amount to more than the balance, so that the Government put out £15 with one hand and rake in anything over that amount with the other. Considering that over £3,000 was placed on the estimates last year for the utility side, it does seem a little bit rough that the fanciers' club should be docked of a beggarly appropriation. As for the reasons, alleged or actual, we don't know of any, and what is of more importance, neither did Mr. Pascoe. Somebody suggested that the Minister wanted to build up a little pile to set against the share of the £10,000 Egg Circle money, squandered, during his last term of office. If this is the case, one can sympathize with so laudable an intention, whilst recognising its futility.

Instructions to Beginners

In reprinting the following article from the pen of Mrs. Mackey in the "American Poultry Journal," we desire to record an opinion, viz., that most poultry men can learn something from all poultry women:—

"It is to be presumed that every amateur fancier and breeder is ambitious to attain a prominent reputation with the public and establish a paying business. I place ambition at the very foundation of all success; without proper ambition no one can succeed in any line of business.

Let the ambition be to stand on the very top rung of the ladder of success. Notwithstanding there is not any more space on the pinnacle of success than at the base, still it is true there 'is always room at the top,' because only a few reach the sublimest height, nor is failure to succeed as often attributable to a lack of capability as is generally supposed. Failure is more often the result of lack of adaptability and perseverance than from any other causes. If one in this century expects to get to the top, he must make up his mind that he must patiently persevere in his undertaking—not that he must slowly plod along, for he or she must hustle or some one else will get in front of them.

Be sure there is no royal road to success. In order to succeed as a poultry-breeder one must either have a natural or acquired love for the business—no man or woman will ever succeed who simply throws the feed to the chicks three times a day and shuts the coops at night, opening them in the morning. To be a successful fancier he must love the beautiful and anything short of the best must be an eyesore to him.

There are many successful poultry raisers who can never be fanciers. Taking for granted that you are a lover of poultry, have a taste for the work and an eye for the beautiful, you can with proper knowledge become successful in the culture of poultry. I have not space in this paper to enter into all the details of success. The first thing to do is to take as many first-class practical poultry journals as possible. Decide just what breed you wish to take up and be sure that you do not take more than one of fowls, and if able to do so, one of turkeys. Visit a good poultry show, study the book of success by listening to the experience of others. When you have made your decision, buy either birds or eggs, or both, from some reliable fancier, and there are many. Don't make the mistake of buying a few from one and a few more from another. Mixing strains is very unsatisfactory.

Get a good incubator; if you get only a one-hundred-egg one, get an incubator. Keep your hens laying by feeding them a well balanced ration. I can only give a few rules of success in rearing, as there are other rules to cover. Don't overfeed, keep free from lice, don't crowd, keep clean, plenty of water, sunshine and shade. The sunshine is as necessary early as the shade is in summer. Get your chicks out as early as possible, keep them comfortably warm, but not over-heated. Feed some one of the many good chick foods. Grit is a necessity. A sand pile is very beneficial to the digestion of young chicks. Crushed oyster shells must not be omitted if chicks are left in confinement.

Fine houses are not necessary, but inexpensive ones with good ventilation are essentials. They must be warm in winter and cool in summer. I prefer several small houses in different localities to one large one. I have houses from 8 to 12 feet long by 4 to 6 feet wide. Have portable roosts in order to clean easily. For young chicks use brooders and coops. The coops or hovers I use are made of dry goods boxes. Have a tight-fitting bottom and put a roof slanting from the front six to ten inches. If you have plenty of money you can have expensive houses and but they are not necessary to success.

At the end of the season, when you find all your labor repaid by beautiful flocks of young birds you will be anxious to dispose of the surplus. If you have not already purchased a standard of perfection, do not delay it longer. You will also need the assistance of an expert judge to teach you how to apply the standard. Do not be discouraged when he disqualifies many birds you consider faultless. When you have culled closely, sell the culls on the market. Now you are prepared to sell as breeders to whomever wishes to purchase. Do not make the mistake of selling your best birds.

Keep them to breed from. Now you are prepared to advertise your stock. Select as many of the best journals as you think your surplus will justify you in using. I would advise that you take one yearly advertisement in preference to many short-time ones.

Make your advertisement one that will attract the attention of the reader. There will be no trouble about not receiving enquiries. There will be plenty of replies to your advertisement. It

s left with you to make the sales. When re... to enquiries don't say too much; be business-like; don't insist on a sale; don't over-estimate your stock; above all, never tell how much better it is than some other fancier's. Attend strictly to your own business. Make a friend of every customer, if possible, by doing a little better than you offer. Treat all complaints, however unreasonable, with consideration. Nine times out of ten you can win the complainer to your way of thinking. Be patient even with those who are not courteous; at the same firmly maintain your position and defend your rights. Command the respect of your customers and you will have their friendship. Be candid enough to acknowledge a mistake and honorable enough to correct an error when you are convinced one has been committeed, and you will find that your reputation will grow faster than you had hoped.

While I would advise every amateur to think well of his reputation, I would advise him to care far less for that than for the principle of right. Never send out a bird you would not be willing to receive were relations reversed. Don't make haste to be rich; if you do, you will fall into a snare and fail. You will make money slower at first by being very careful that you send out nothing that you are not perfectly sure will please, but you are laying a foundation for future success. I have spent hours in the selection of one pen of birds. Sometimes I have been days making up my mind whether I dare risk a certain bird in an order. Assistants have lost all patience with me for changing birds several times before shipping. After eighteen years' experience I tremble when I open a letter from a new customer in acknowledgment of stock and eggs. Not because of the amount involved in the transaction, but because I do not want anybody's money unless they feel they have value received.

Do not go into the poultry business unless you have perseverance and stick-to-it-iveness, for it will not, like a mushroom, spring up in a night. You can realise a profit from the first, but if you expect that all will be profit and no loss, you will be mistaken. By the natural course of events you will meet with disappointments, discouragements, and reverses of various kinds. Do not let any of these deter you from keeping right on, remembering that success will crown the efforts of those who strive. One of the best helps to success in getting before the public is to write up in a plain, straight-forward manner your experiences for some good poultry journal.

Do not blow your business up, making your article disgusting, but tell how you manage your poultry, what methods have given you the most satisfactory results. Don't be afraid to speak of your failures. Persons reading your article can easily discern whether you are writing facts or only advertising your stock. If the former, you will receive letters of enquiry, congratulation, and sympathy. If the latter, only a few unwary ones will be caught in your net. Have a speciality, stick to it, learn it, let people be convinced that you know what you say, and without even expecting it you will be quoted as good authority on that subject.

Never sit down and conclude that your stock is the best in the world, for if this were true, when you took your seat, before you could get to your poultry yard to enjoy the sight of that best flock, some one would excel you by his perseverance. There is no best until perfection has been reached, and perfection is not found on earth; hence let improvement be your watchword in breeding. Be as anxious to see the faults in your own birds as you are to discern them in your brother and sister fanciers, and more anxious to see the faults than the virtues. Do not pay any attention to the man who says it is dishonest to sell a bird for one dollar. Remember you are a beginner, and, no matter what your price, the noted fanciers will not buy from you—you must establish yourself. You will depend on farmers and possibly other amateurs for your patronage until you have made some reputation as a fancier. You can get this quicker in the show room than anywhere else. When you get an enquiry find out as nearly as possible what your prospective customer wants; if you have it, make the price an inducement. If he is a fancier he will not buy a low-priced bird, but if he is a farmer or market poultryman he will not in all probability pay a fancy price. You had better sell a bird for less than it is worth than to keep it in your yards where only a very small circle will see it. You want to put your stock where it can be seen. Every satisfied customer will send you others and as even the farmer sees the superiority of your stock he will be willing to pay better prices."

Egg Production

How to get it and what Influences it. By Rev. Edar Warren, in American Poultry Journal.

It is not difficult to get a satisfactory egg record where one goes about it the right way. Last year my hens laid 156 eggs apiece. I was so situated that I could not give them the careful and constant attention I had given them in years past. Still I think they did pretty well, and although I have made better records, yet I have made none that I am more proud of.

Doubtless heredity has an influence upon egg production. We have it on high authority that men do not gather grapes from thorns nor figs from thistles. And yet I am inclined to think that heredity is not the all-important factor we sometimes make it out to be. It is a common experience that pullets from hens that have a prodigious egg record make disappointing layers. The reason is the egg-laying habit is not sufficiently established to be handed down. It is a fundamental principle of heredity that artificial traits cannot be transmitted. Ingorance of this fact sometimes costs a man dear. It is folly to expect in a few years by breeding from hens that have been pushed to their untmost limit, to build up a strain of phenomenal layers. The most we can do is to eliminate the poorest layers, and from those that are left by intelligent care and feeding gradually build up a strain that will give a good account of themselves.

Give me strong, hardly birds, hatched from eggs that came from hens that were good layers but were not forced or stimulated in any way, and I will bet that I can get plenty of eggs all the year round.

— Small Breeds for Eggs.—

Size undoubtedly has an influence upon egg production. As a general rule the smaller breeds are the better layers. It takes the big kind longer to come to maturity, and a large proportion of what she eats must go to repair the waste of her great frame. The small birds are specialists, and their specialty is eggs. If a man wants eggs, and plenty of them—eggs and nothing but eggs—he would best stick to the small breeds.

Many think that the day is coming when eggs will be sold by weight and not by count—by the pound and and not by the dozen. I am not one of those who share this belief. There is an instinct of conservatism about the Anglo-Saxon that makes him cling to ways to which he is accustomed rather than change to unknown ways that are theoretically better. Could anything be more illogical and absurd than the spelling of many English words? And yet spelling reform makes discouragingly slow progress. The metric system is undoubtedly much more logical and scientific than the common system of measurement; and yet it will be years and years, if ever, before the meter is substituted for the yard and the kilometer for the mile. Eggs have been sold by the dozen in this country ever since Captain Cook landed, and they will be sold by the dozen to the end of time.

It would not be difficult to make a good argument, if argument were needed, for the present practice of selling eggs by the dozen and not by the pound—the argument from economy and convenience. Eggs are fragile things, and even where they sold by count the breakage is considerable. But it is nothing to what it would be were eggs sold by weight, for it would then be necessary to handle them much more than it is now. And how would an exact pound of eggs be weighed out? Imagine a grocer with a particular customer, trying to weigh just a pound of eggs. He has seven eggs in the scales, weighing, let us say, fourteen ounces and a half. How will he get the other ounce and a half—that and nothing more? The law of permutation will tell us that with seven eggs in the scales and a tub of eggs on the counter, the merchant's chances of weighing out just an even pound would be one to a total that would require the unit and a line of zeros long enough to frighten one.

Maturity is an important thing. The bird that is to be pushed for eggs must be thoroughly mature or she cannot stand the pace. When I began to keep hens I was pleased down to the ground whenever a little misguided pullet began to lay at the age of four or five months, and I would send an item about it to the local paper. But I have learned better now. A precocious bird never makes a phenomenal layer. She lays one litter of eggs in September or October and then shuts up shop until February or March. I want a bird that has got her growth, a bird that is thoroughly mature; and I will keep her busy from the time she lays her first egg, about Thanksgiving, until she goes into moult the following fall.

— Old Hens and Pullets. —

In this connection the question comes up, How long does it pay to keep a hen after she begins to lay—one or two years? I am more and more inclined to say two years rather than one. It is true, the big egg records are always made by pullets. But in order to get a pullet where she can lay right along it is necessary to keep her six or eight months. But a year-old hen, rightly treated, will finish her moult and go to laying again in as many weeks. Let us do a little figuring. Suppose a pullet with good care will lay 150 eggs a year, and a hen 125; and suppose these eggs are worth 2 cents apiece. It would seem on the face of it that the pullet will lay 50 cents worth more of eggs than the hen, and is accordingly a more profitable proposition. But in the case of the pullet there are behind the 150 eggs from six to eight unproductive months and in the case of the hen only two.

In other words, while it has taken the pullet twenty months to lay 150 eggs, it has taken the hen twelve to lay 125. The balance, therefore, is on the side of the hen.

The comfort of the laying hen must be looked after. Old persons tell me that when they were children, hens were never expected to lay in the winter. I do not wonder. The hens were given no care whatever. They were allowed to roost on the great beams in the barn, to break the ice in the horse trough when they wanted a drink, and to pick up their living as best they could. Occasionally a few handfuls of whole corn were thrown down to them. Time has changed all this. Hens are now expected to lay in winter as well as in summer. But they will not do so without summer conditions. They must have a warm. comfortable house, plenty of sunshine and pure air, a chance to take a dust bath every day, and must be kept clean and free from lice. They will show their appreciation of such care by a liberal output of eggs.

In order to get eggs out of a hen we must put eggs into the hen—in other words, we must feed right. It does not require a college education to do this. There are any quantity of old women in the land who feed their hens just as they mix up their bread, by guess, who get results that the scientific feeder might envy. And yet I believe in a scientific knowledge of food values, and in feeding according to rule.

— The Golden Rule for Feeding. —

Give the hen a sufficient variety and quantity to meet all the needs of her system and leave a margin for egg production. A warm mash in the morning, all she will eat with good relish in ten or fifteen minutes. Enough grain during the day so that she will go to roost with a crop moderately full—neither distended on the one hand nor nearly empty on the other. Green food, either in mash or separately. More heating food in winter and more of it than in summer. In general it may be said that one ounce food a day for each pound she weighs is about right for the average hen.

— Culling the Flocks. —

Culling the flock in order to maintain, as much as possible, that difference between income and outgo that constitutes profit, is a somewhat different matter with the strictly utility poultry keeper than it is with the exclusive fancier. Between these two classes there is evidently some difference of opinion as to what a "good layer" must be. The word "good" is easily spoken and easily written. "Good layers" are none too common, nevertheless.

From a market-egg standpoint a hen is not a good layer—not a profitable layer unless she produces eggs enough, during the time that she is kept, to pay for her food and care and leave a margin of profit.

Leaving out of the question at this time the difference in the size and color of the eggs as laid by different individuals in the flock, and by the same individuals at different times—a matter of much importance with some poultry keepers, of none to others—leaving this out, and using the first general proposition as a standard for measuring a hen's value as an egg producer, it will be seen that it is greatly to our advantage to retain in our flocks only good layers and to market the poor layers as soon as their true colors are shown. Incidentally let me say that a 50 per cent or a 70 per cent egg yield is no indication that the healthy individuals composing the flock are each contributing evenly or profitably to the supply, or that the profitable layers of one period are the same individuals that lay profitably at another period.

We all know the general characteristics that mark the vigorous, healthy active hen to the observing eye of the caretaker. They are by no means a guarantee of profitable egg production.

We all know the natural causes that may interrupt laying at certain periods in a hen's life. Broodiness and molting have always been recognized as valid excuses for a hen that ceases to lay. There is no way, however, to determine that a hen has been a good layer except by the record, in black and white, of what she has actually done in the nest.

There is no way known to determine that a hen is a good layer except by ascertaining, sufficiently well to make it a subject of record, just what she is doing in the nest.

There is no way to determine that a healthy, well developed hen is or is not likely to be a profitable layer of market eggs, reckoning forward from any period in her adult life, except through a knowledge of her laying habit as revealed in the records of her past work. It is not my purpose to combat the claims of experts in feeding, but simply to state, in plain unequivocal language, facts that have developed in the handling of a considerable number of hens, for several years, under conditions of feeding and care that, if not scientifically correct, permitted of good egg yields from many individuals. Had the feeding and care been better the egg yield would have doubtless been larger, but the points that I am making would, I beleve, be the same. Profitable egg production is due to an individual trait first — becoming a family characteristic only by selection and breeding—and made still more profitable by judicious feeding and suitable environment.

Here is where tha trap nest comes in as a valuable aid to our poultry work.

By its use we can record the nest history of the hen. The most retentive memory would be powerless to retain such a history even if the caretaker could determine the necessary facts, as they transpired, by painstaking observation. Even this he cannot do, except very imperfectly, in a small flock given almost constant attention. The writer has hens that have laid from 100 to 150 eggs in the past six months. No man can distinguish them from their less prolific mates, and the writer, although he has handled them each day that they have laid, cannot pick them out except by their leg-band numbers that are on record. I spend but little time in their company.

In July thirty-five birds were marketed (many of them last season's pullets). With the excention of five none of them could be selected by observation as being unprofitable stock to retain. Many of them were laying when sold, but not profitably and they would have soon stopped. Their past record disclosed a type of hen that I have never been able to get a profitable yearly egg yield from. They were taken from every pen on the place. With my flock reduced 25 per cent the remainder are keeping up the egg supply. We have less hens, but are getting as many eggs as before.

In February I marketed such pullets as had shown me that they could not be retained profitably. In July I marketed those that I believed had paid me all the profit of which they

(Continued on page 42).

What to do Now.

Please note the emphasis on the Now. I want that to be the key-note of the article which will appear on this page from month to month.

I do not intend my heading to refer to the many small duties which, like the poor, are always with us. These may, I think, be summed up thus :—Be clean, feed wisely, be prompt in doing the many little things which crop up from day to day. These are the A.B.C. of the poultry man's work. The successful man begins with them and keeps them in mind to the end of his career.

There are, however, many duties and pleasures which, though not so constant are in a different way of equal importance, but the fact that they are not part of the regular work sometimes leads to their being overlooked.

We are now in the month of June, probably the most interesting of all from a poultry man's point of view. The successful breeder, whether fancier or farmer, will have his stock weeded down to bedrock, most of his surplus good ones sold, the poor ones eaten, his picked birds looking at their best, and all his plans made for the season's work without there having been time for the inevitable disappointments to happen along.

That is how the successful man is fixed, but poultry papers or articles are not written for him. He buys them for the sake of Auld Lang Syne, and for any items of news and information which may crop up, and for business. He occasionally no doubt gets a hint or an idea which he first tests and sometimes uses. This he generally regards as an incidental, or not altogether expected blessing.

The individual who really wants a poultry paper is the man or woman who is still at the trying to succeed stage. I do not wish to argue that he or she will find the whole way made plain to him in any book or paper ever published, and certainly not in this article, for I recognise fully that the great teacher is experience ; nevertheless, a printed page may be helpful to some readers in the "What to do Now" and "What not to do at all" of poultry breeding.

To my mind the surest method of helping such a reader will be to look back to the time when the now successful man was just emerging from the "trying" stage and find out just what he was doing a few or, perhaps, many Junes ago. I think there is little doubt that this happened just when he recognised that the beginning, middle, and most of the end of sucsessful poultry breeding was in the breeding pen. We should find, too, that his first step upward came when he began to learn the secret of the proper mating of his birds, and this after a rather round-about journey brings me to the first of the things to do now, which is

— Mate, and Mate Properly. —

Having arrived at my subject I must confess to finding it so big that I am tempted to compress it into the tabloid form.

Mate.

Mate now.

Mate intelligently.

Mate for best results.

Mate to correct defects.

Mate to fix good points.

This in substance is what our successful man did when he began to go ahead. He saw, too, that quality, not quantity, must be his aim. This by the way is a very marked dividing line between the beginner and the older breeder. The former hatches many chicks and hopes that some will be good. Sometimes he even expects that all will be so. The other man hatches few, but knows that many will be good.

In making up his best breeding pen there are a few simple rules which we may be sure our man followed when he began his successful career. Here they are, and the reasons why he acted on them.

He mated only a few, perhaps only a pair or two, because he could more easily keep track of the parentage and breeding of his stock, and because he, like every one else, had only one or two "bests," and that was the sort he wanted to see produced.

He used only healthy birds because he knew that the growth, form, feather, and development of his chicks must to a great extent depend on the health and vigor of the parents.

Whenever possible he bred only from second season birds which had been tried because, as a fancier, he knew that a proved breeder of good stock is a solid foundation.

He tested his birds as breeders before selling eggs from them, because he knew that by so doing he might save those who bought from him much disappointment and himself from much angry correspondence.

He was content to go slowly till he got a grip of his stock, because he knew that even the most brilliant cockerel of the year might upset his little apple-cart.

He did not keep many varieties, and only tried to breed one seriously because he found that in even one there is much to learn. Besides, he thought that to be at the top in one is better than to be lower down in many, and found that to get there takes all the time, money, and knowledge most young breeders have to spare.

He never sold his best birds, and bred from the second-raters or from what he chanced to buy, because—well, principally because he wasn't an ass.

He would not part with a bird which had bred him winners unless he also had one which had

one even better, because he knew hat such birds are rare.

He knew there were many excep- ions to every rule, and when hese exceptions got up and hit im he just waited till they had nished, because he knew he was n the right track.

Now I think if I have been able o make clear to my readers ome of the ideas our friend the uccessful man had in his mind, hose few years ago, some of them who are trying for the best sort f success in poultry breeding may ave picked up a point or two to elp them on the journey, and hey should put them into practice ow.

There are many other things which our successful man would ave in mind at this time of the ear, for he would be one who ooked ahead and provided for the uture. I think, by the way, it will be best to kill this successful man at all events for the present; e is, with all his good qualities, ecoming rather cumbersome. Hav- ng thus comfortably disposed of im, I will proceed.

Amongst the thing which it be- oves the poultry keeper to look head in is the provision of shade or his birds; but how often is his left till the summer heat is with us. Then we rush in some uick growing creeper or some maize and wait whilst the poor owls pant through a hot Novem- er or December without a green nd shady spot to help them hrough the time. This is a mis- ake. The right time to provide or summer shade is right Now.

Fruit trees and fowls are so na- ural a combination that it is a urprise that poultry men do not make more use of the quick-grow- ng peach, plum, apricot, and fig n adding to the appearance of heir yards and the comfort of the irds.

At first sight the idea of grow- ng luscious peaches and a batch f ravenous cockerels on the same iece of ground may appear to resent some difficulties, but in ractice many of these disappear, o I must confess do some of the eaches, but more than enough re- main to make the double use of the pen very profitable. In advo- cating the planting of fruit trees n poultry yards, I do not wish to nter on the larger question of "Poultry in the Orchard." In this case the fruitgrower adapts his me- thods to his purpose. I refer ra- ther to town and suburban homes, where the owner likes fat fowls and fresh fruit of his own growing.

I think the damage done by fowls to any trees or shrubs is very much exaggerated, and in any case can be greatly minimised by adopting the plan of planting along the sides or dividing fences of the yard and growing them on a simple trellis, or, better still, along the wire netting of which poultry pens are usually construct- ed. One does not need to be an expert with the secateurs to keep trees so grown within bounds. By following this plan there is no perch room in the trees for the birds, so that little or no damage to growing shoots, and what I be- lieve are called laterals, is likely to be done. A row of trees need, in fact, be no more than a live hedge not more than a foot in extreme thickness. A set of pens in which each dividing fence is so used will make a wonderful im- provement on the bare little prison one too often sees and hears called a nice little pen. In spring the blossom will be beau- tiful enough to win the admira- tion of even the most hardened utilitarian, whilst in summer the wall of shady greenery would be pleasant and healthful for the birds, and the fruit, with which each well-grown tree would be studded, would be profitable to their owner.

The growing habit of most or rather many fruits lends itself ad- mirably to this system, but the quick growth and early fruiting of the peach, apricot, and plum make them specially good for the pur- pose.

The almond is another of the trees which may be profitab,y planted in and around the poultry yards. The roughness of bark is sometimes spoken of as an objec- tion, because of the harbor it gives for vermin. This is a bogey which need frighten no one, for a little hot water with some phenytas is a quick and sure solution of any possible trouble in this direction. The almond can be grown on the netting as well as a peach.

The fig is another grand tree for the poultry man's use. The smooth trunk, fair growth, and dense shade it gives are advan- tages which place the fig quite at the head of the list of the trees for the poultry yard, and, al- though at first the fig seems an obstinate stiff necked, or, rather, stiff wooded tree to train on a fence, it is not so in practice, for all that is needed is to suppress all bent wood, i.e., all growth which does not adapt itself to the plane of the fence. This is done when the shoots put out, and all the growth then goes into the shoots on the fence. The fowl man need not attempt the regu- larity of the grower of English espalier fruit, for all he wants is a productive shade-producing hedge.

The olive, when already on the premises, is another boon to the poultry breeder, who happens to to have old trees; but except in favorable conditions it is rather a slow grower. The same may be said of the carob.

My readers will have noticed that I have looked at the plant- ing question more as its affects the welfare of the birds, but it must be remembered that they pay this back with interest for they are earnest cultivators (if you doubt it, turn some loose on a freshly planted bed of peas), and the sweepings of a yard as dressing for fruit trees takes a power of beating; it is, in fact, the secret of the wonderful growth of trees, shrubs, or creepers, planted in poultry yards which is so often commented on. Finally, I think that we can safely put down fruit trees for future shade as one of the things to do Now, so choose your variety, plant them carefully, not just stick them in in such fashion that they have to lean up against the fence for support, and in the season after next you may be sampling Selway's, Red May's, Sea Eagle's, Newcastle Early's, etc., of your own growing. The first crop will not be a big one, but there is one consolation, it will never be smaller afterwards.

Young chickens should not be pampered. An abundance of heal- thy food in good condition is all they require.

As the youngsters grow they require more exercise in order to develop themselves and gain size and health. Freedom is best for them, or when complete freedom cannot be given other means must be resorted to in order to obtain the best results.

(Continued from page 39).

were capable, and I beleive that hens may be so bred and maintained that they will pay profitably for more than two years. I have found that the profitable period of some is limited to a few months.

I aim to cull constantly, every month if necessary, and remove from the expense account all birds that are not somewhere near my standard as egg producers. It takes time and experience to learn to read our charts (the egg records) correctly, but they are safe and sure guides when understood.

The extent of the incubating tendency of individuals hens is clearly shown to the experienced trap nest user. This trait is, to a greater or less degree, opposed to prolificacy. I have found that a considerable proportion of 'my most persistent "broodies" were poor in flesh and that heavy feeding, even of carbonaceous foods, does not induce broodiness in my most persistent layers. The opposite course does not prevent it in birds of a strong incubating tendency. This has been a subject of experiment with me for several years. While feeding may have an effect in hastening or delaying broodiness, and I am quite sure that it sometimes does, the natural trait or tendency of the individual has much more to do with it.

A fancier friend of mine says that his Plymouth Rocks do not become broody because they are such heavy layers, but I tell him that they lay more steadily because they do not become broody. A distinction with a difference, as I believe.

Select the Best for Keeping Over.

The laying hen, in almost every case, is one that is active and busy. The one that is never idle is, as a rule, a good layer for the reason that her active habits keep her in proper condition for producing eggs. Therefore before sorting out the pullets to keep over, we should watch closely for the workers and retain them only, but first provide some way for them to busy themselves. A lot of pullets kept in a yard, even if there is plenty of grass, will not be able to scratch and work so that their owner can tell by their actions whether they are the kind he wants for eggs or not. They must be provided with a scratching shed, or room, and several inches of dry chaff or straw kept on the floor, then if all the grain given to them is scattered in this litter the drones can be much easier picked out.

A bright, red comb and wattles and a happy disposition are indications of a good layer; bright and prominent eyes and a clean, smooth plumage are also points to notice, but then nearly all hens have this appearance about the time they are to commence laying and it is before this period that we want to make the selection, so we must look after some other points. One very good rule to go by, I think, is the size and weight of a pullet. If she is inclined to get fat and heavy, I would discard here. Generally speaking, if she is of the laying type, she will have fine bones. This is seen in the shank, which is slender and relatively short. A small feminine head and slender neck indicate that she is one of the kind we want for eggs. The body of a good layer is usually rather long and wedge-shaped, smaller in front than back, and she is generally of the sort that prefer to get her food by working for it rather than come up to the trough and eat. Disposition, restless, and ready to pick a fight at all times with other hens.

Now, if you are able to select from your flock a lot of pullets that appear to have these characteristics, the probabilities are that you may have a better lot of egg producers than you had last winter. Next, after you have made the choice, try some trap-nests, so as to be sure which the profitable ones are. Then, after being absolutely certain which the best layers are, select the most promising ones from this lot and mate them with a male from a good laying strain and the shortest road to success will, at once, be taken, which, if followed up, cannot help but bring satisfactory returns to the owner.

The importance of having a good male bird should not be overlooked. His influence on the future progeny is greater than any female in the flock; he being sire of all instead of a few only; hence a good deal of consideration should be given to his selection.

Laying hens want plenty of water; let it be fresh; impure water will often taint the eggs.

Publications Received.

WEATHER NOTES.

At such times as this when the weather, is the subject of so much discussion, it is opportune to draw attention to the importance of securing the fullest possible information on the subject of local rain falls etc. The area covered by the work of the Federal Meteorological Bureau, is so vast that it is only by the efforts of individual observers acting in conjuction with the authorities, that the greatest amount of data can be obtained, to this Mr. Hunt draws attention in the following letter recently received for publication :—

Dear Sir,

A volume is being prepared in the Central Weather Bureau, containing all available rainfkll information with respect to South Austra.ia. It is desired to make the work as complete as possible, and, knowing that many residents in your State have kept continuous meteorological records for many years past, it is eminently desirable that their valuable rainfall statistics should be embodied. A cordial request is therefore made that any resident of South Australia possessed of such matter, will kindly forward copies to the Commonwealth meteorogist, Central Weather Bureau, Melbourne, as early as possible.

Any striking meteorological events, with dates, in the nature cyclones, monsoons, floods, excessive rains, droughts, etc., during the recollection of any person, will also be highly appreciated.

The contributars of accepted information in the prejected volume will, of course, receive a copy when published.

Any correspondence re the above will not require to be stamped. Yours faithfully, H. A. Hunt, Commonwealth Meteorologist.

P S.—It might be mentioned that raingauges are issued free of charge to responsible applicants in districts not already represented, on condition that regular monthly returns are sent in.

FIELD TO DAIRY.

We have recently received from the Author a copy of the second edition of of this very handy little work. Whilst it makes no pretentions to be exhaustive study of the subject of which it treats, it never the less brings together within small compass a very great deal of useful information. To those interested in the subject its purchase and perusal can be heartily recommanded. It is obtainable from all book sellers.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide. Telephone, 1234.

Home Notes.

Ammonia and Its Uses.

The use of ammonia as a source of nitrogen for plant food belongs to the farm and garden pages, and its use in manufacture and chemistry are outside the scope of the "Garden and Fiels;" but its uses in the home are so important that we think we cannot select a better subject for our domestic chat. It won't help anyone in the use of ammonia to know the origin of the name or how it is made, but it will probably interest many.

Ages ago in ancient Egypt as now, one of the chief articles of fuel in that almost treeless country was the dung of animals, especially of the camel. From the soot from the fires near the temple of the god Jupiter Ammon a substance was obtained which recieved its name, sal ammoniac, from the temple near by.

Such is the origin of the name given by the British Pharmacopaeia. Ammonia was afterwards manufactured either from decomposing urine or the destructive distillation of animal substances, among which was the horns of deer, hence the name spirits of hartshorn of the old chemists.

With sal ammoniac people are familiar either as a substance for charging electric bell batteries or as used by plumbers for cleansing the soldering irons. This is chloride of ammonia..

With carbonate of ammonia the ladies are all familiar, for it is the basis of the smelling salts bottle. It is also used occasionally in cooking to cause bread or scones to rise.

The present notes are, however, intended to deal with the liquid form of ammonia known as aqua ammonia, which is merely water in which ammonia gas is dissolved. This may be had as pure form such as Roche's fragrant lavender ammonia, and there is no article more useful in the home than a bottle of fluid ammonia. For over twenty years the writer has never been without a supply and during that time he has shown scores of people some of its varied uses.

Should you by accident get spots grease on your clothes, a little ammonia water applied with sponge or flannel will completely remove them.

Should your coat collar show signs of becoming soiled and greasy, a little ammonia and a sponge will clean it in a few moments.

A little ammonia in tepid water will soften and cleanse the skin.

Door-plates may be cleansed by rubbing with a cloth, dipped in ammonia and water.

To brighten carpets sweep them well and wipe them with warm water, into which has been poured a few hrops of ammonia.

A tablespoonful of ammonia in a gallon of warm water will often restore colors in carpets, and will also remove whitewash from carpets.

Yellow oil stains left by the sewing-machine may be removed by rubbing the spot with a clothwet with ammonia before washing with soap.

By rubbing nickel and silver ornaments with a wollen cloth, saturated with ammonia water, they may be kept very bright With but little trouble.

If those who perspire freely will use a little ammonia in their bath daily it would keep their flesh clean and sweet, doing away with all disagreeable odor.

Spirits of ammonia will often remove severe headache, out the constant use of salts, of ammonia, and other strong scents injures and inflames the nose.

Equal parts of ammonia and turpentine will take the paint out of clothing, even if it has become hard and dry. Wet the spot as necessary, and wash out in soap suds.

Eyeglasses, spectacles, and glass mirrors may be cleaned perfectly by rubbing with a clean soft cloth and a little ammonia water.

A mixture of one part ammonia water and four or more parts of soft water can be used for almost any purpose for which soap and water are used and for others besides. A sponge or soft cloth moistened in it will cleanse paint or varnish better than anything else without any severe rubbing.

Ammonia and water is the handiest thing with which to cleanse furniture and picture frames, etc., and articles which would be injured by rubbing.

There is no better way of cleansing and brightening watch chains and other articles of jewellery than by washing them in warm water and ammonia.

For cleansing hair brushes and combs there is nothing to equal a little ammonia in warm water. Gently move the hair of the brush face downwards in the water keeping the back out.

Liquid ammonia is useful to apply to the bites of insects, such as mosquitos, in order to allay the irritation.

Half a spoonful of ammonia water, esuecially one of the specially prepared forms, such as Rocke's lavender ammonia, added to baby's bath or to a basin of water is very refreshing and cleansing. It is surprising how it softens hard water etc.

In washing the hair, especially the long tresses of women, a teaspoonful of Rocke's lavender ammonia will make the water soft, will remove dandruff, and will leave the hair soft and pleasant.

For washing glass and silverware there is nothing to beat a little ammonia water added to soft warm water. It is also about the best thing to use for cleaning marble tables, mantels, and so forth, especially where there is any grease.

Ammonia water added to the water in which clothes are put to soak will lessen by a good deal the toil of the weekly wash.

Ammonia water added to the children's "Saturday night" hot bath has a splendid effect. For this purpose a prepated form such as Rocke's lavender ammonia is useful because it is not only cleansing, but imparts a sweet lavender perfume to the skin.

Domestic Uses of Glycerine.

Nothing is better for chapped hands than a mixture of glycerine and olive oil in equal proportions. Wash thoroughly in warm water with a little ammonia, rinse well in warm water, and rub in the mixture before the fire. The softness of the oil takes away the smarting property of the glycerine and lemon juice is excellent used in the same way, but it smarts.

To make glycerine jelly dissolve a one ounce packet of table gelatine in a little water; then whisk it into a pint of glycerine previously warned. It can be lightly colored with cochineal. Pour into pots. If too stiff add more glycerine. An ounce packet of gelatine stirred into four ounces of

hot glycerine, the gelatine being first softened with water, will form a mixture which sets hard. While warm add the juice ol a lemon. This, cut into squares, is excellent to use io throat troubles.

A tin of condensed milk, four ounces of glycerine, two ounces of honey, and a half pound of sugar make a honey-scotch nice to take, and very nutritious.

If a laxative is required, two teaspoonfuls of glycerine swallowed warm at intervals of an hour are what is needed.

As a remedy for indigestion a teaspoonful of glycerine after meals is said to be a perfect cure for some people.

For pimples, flowers of sulphur mixed with glycerine is a splendid remedy.

6 For earache, a few drops of warm glycerine poured into the ear soothes and heals, and equal parts of belladonna and glycerine mixed and rubbed round the ear will soothe the pain if severe.

The soldier whose dead body forms a shelter for his surviving comrade is equally deserving of honor with him who carries the fortress.

Household Hints.

— Mildew on Leather. —

Mildew or stains of any kind may safely be removed from leather with a little pure vaseline till absorbed, and then polish with a chamois leather.

— To Clean a Copper Kettle. —

Scour the kettle with a cut lemon dipped in bathbrick to remove the stains, and then wash in warm, soapy water. Polish with dry, powdered bathbrick and a soft cloth. A paste made of powdered bathbrick and oil may be used instead of the lemon, if preferred.

— To Clean White Skin Rugs. —

Sponging with naphtha is said to be the best method, but naphtha is so inflammable that the greatest care is necessary when it is used. In fact unless the cleaning can be done out of doors, well out of the way of danger from fire and artificial lights, it is better to intrust it to a professional cleaner.

— To Remove Egg Stains. —

Egg stains on linen, or on any other cloth, should be soaked in cold water for hot water would set the stains and make them most difficult to remove. The same rule applies to egg stains on dishes, etc. If the dishes were placed at once in hot water the egg stains would be found to harden, but they readily come off in cold water.

— Dish Cloths. —

Excellent dish cloths are made of knitted cotton, for they are very strong, and can be washed and boiled again and again, and will come out like new. Every time a dish cloth is used it should be washed with soap and soda, and rung out to dry. A dirty dish cloth is a disgrace to its user. Children who are beginning to learn to knit are generally very willing to make dish cloths, but when one is very busy, neatly hemmed squares of coarse crash will answer the purpose very well, and these are made "in no time."

Never use a metalled spoon for stirring stewed fruit or tomatoes. A wooden one is better, and those with short handles are preferable.

Meat may be kept in the hottest weather by the following method:— Make a large muslin bag, dip it in vinegar, wring it out, and then hang the meat in it. Do this each day, and be careful to hang it in a current of air.

For large shoes which slip at the heel glue a shaped piece of velvet to the inside, bottom, and side of the heel, and it will cling to the stocking.

Suet puddings are most nourishing if the suet is chopped as fine as possible, and the whole thoroughly well boiled. Any suet left over will keep good for weeks if melted down in a saucepan, strained and stored in a covered pot.

When baking a cake, if your oven is inclined to burn, fold a newspaper and put it on the shelf under the tin. A basin of water in the oven will also help to prevent things from burning, and many people think that the steam from the water helps to make cakes rise.

What Children Should be Taught.

Children should be taught the following things:—

That teasing is positive crime.

That they must eat bread before pastry.

That bedtime is not a "movable" hour.

That they must speak politely to the servants.

That weeping over bruises is unworthy of sturdy beings.

That they should not appeal to one parent from the decision of the other.

That punishment follows in the wake of prevarication and of deceit more swiftly than it follows actual mischief.

That it is in bad taste for them to tell all that they learn of the neighbours' domestic arrangements through playing with the neighbours' children.

Pigeon Notes.

S.A. Pigeon and Canary Society.

Fanciers are reminded that the annual show of the above society will be held on the 7th and 8th inst. at the Trades' Hall, Grote Street; all interested are cordially invited to be present.

Victorian Notes.

By G. J. M.

A week ago I had the treat of my life. I paid a visit to a loft wherein I saw the best conditioned lot of birds I ever had the luck to clap eyes on.

They were in the loft of Mr. Gus Shee, now well known throughout Australia for his Saddle-backs. Each bird was in the absolute nick of condition, spruce and clean and ready to go straight into the show pen. There was a sheen on the feathers which only health can give any creature. Besides peas the only food Mr. Shee gives his pets is a sprinkle of canary seed every morning; of course they get grit and Condy's fluid from time to time. These birds are in a loft over a stable; they never get the sunlight, and they do not fly at liberty, but of course the house is roomy, and they get plenty of exercise.

The event of the month over here took place on last Satur-May 11th, when Messrs. Woodward & Mead sold off most of their birds, including all their Jacobins, Nuns, Homers, and Fantails. The sale was held at Baker's Exchange in the Eastern Market, and the room was so crowded that it was a matter of extreme difficulty to get even a glimpse ol the occupants of the pens. On the whole the prices realized were very satisfactory, although several buyers declared that they had secured absolute bargains. Mr. Woodward goes to England next year, and it is on the cards that the firm will be dissolved. The dissipation abroad of so many good birds into several lofts should have the result of strengthening the Jack and the Magpie fancies over here.

Again there is to be an unfortunate clashing of shows over this side this winter. In this case it is the North Suburban and the big Exhibition shows which fall within three days of one another. This sort of thing is altogether deplorable, and should be easily preventable. I understand that the North Suburban Society is not affiliated with the Victorian Poultry and Kennel Club, but this is no reason that the big club (if it is to blame in the matter, as I have been given to understand) should endeavour to coerce the smaller one, or not take any notice of its fixtures when compiling its own dates.

Diseases in Pigeons.

In a healthy pigeon the feathers should be close-fitting and the ground-colour clear and clean.

In self-coloured birds the bars should stand out clear and well. Any dulness of one colour against the other is an indication that all is not right.

Pigeons' feet should be moderately cool, and the colour of the legs and feet clear and bright.

When the colour of the feet is pale and dull, combined with dull plumage, it is a sure sign all is not well.

The eye is an important factor from which health or condition can be judged.

The experienced fancier can learn much from the eyes of his pigeons. They appear to speak to him and tell him just how the subject feels. Immediately the birds become sick the eye indicates the trouble sooner than anything. A clear bright eye is the surest indication of health, and as soon as a fancier can understand reading the health of his pigeons through the optic organs he has learnt much.

Clear white wattles and hard clean cere are also good indications of health.

Open Border Notes for July.

Where borders are already dug, it is as well to go over them again on a fine day with a small border fork (a very handy tool) just turning the surface. It is well to remind readers again that in clearing the borders, they ought to kill every snail, and slug, which is seen; and to destroy all the eggs dug up. This precaution saves a lot of time and plants later on.

Dahlias may be taken up and stored under some shade tree away from frost. Shrubs out of pots may be still planted out. Grass lawns are dormant, but if a sprinkling of bone dust mixed with a little sandy soil were put on now, it would strengthen the roots for the hot season.

July finishes our planting out of stocks, candytuft, ranunculus, pansies or violas, and any other seedlings. These will make a late show in October.

Winter flowering carnations. These will be required to be covered from the weather, if good flowers are wanted. Tie up the shoots when needed, and any that have flowered are to be cut down to a break. Give a light dressing of dry manure in the form of soot, cow manure, icthemic, bone dust, or Peruvian guano. Plant out new plants from pots or from the open box or bed. Have them properly named and tie up any tall plants; but when well rooted it is better to cut back fairly hard to make them stool out.

If carnations have been struck in heat they should be carefully potted into three-inch pots and put into a close frame for a week or two, before the planting out. Striking may still be done.

Early flowering sweet peas are in bloom, and these will continue for the next three months. The spring flowering kinds are stooling out nicely, and as they begin to run, require stakes or wire netting. Keep the soil stirred about the roots.

Geraniums may be planted out under trees or in dry borders where little else will grow. As the weather warms up these plants will make a fine show. Plant out show and fancy kinds for spring flowering.

Most kinds of climbers may be planted out, and the same can be said of fuchsias, calceolarias, pyrethrums, lobelias, perennial poppies, campanula, and many herbaceous plants.

Cannas can be divided by putting in a fresh place some of the new shoots to be found attached to the old clump. Chrysanthemums should be struck for new plants, and the ground where a bed is intended should be well dressed with lime, soot, and bonedust before being dug deeply.

Pot up seedling Delphiniums into three or four inch pots, and those done some time ago can be planted out. Divide old plants, giving them a shift into a new spot, which is good strong loam, as they are gross feeders, as anyone who has grown them knows. It will not be too late to put out Cinerarias if a sheltered place and the earlier planted will be coming into bloom. Liquid manure is good for these at this stage if carefully given. Cuttings of coleus, salvias, plecthranus, Iresines, impatiens may be taken from those already struck. This keeps the stock up for the summer planting. Tidy up paths, from weeds, etc., and gravel same. Still turn over your manure heaps, and also rubbish heaps which are to be used for compost.

The Cineraria will do better if watered with a fine rose can over their foliage with rain water. These seedlings are sometimes attacked with the aphis, Gishurst's compound or tobacco water will be found efficacious in removing them.

The Rose Garden.

Written for the American Rose Saciety.

Grand as are masses of roses we have occasionally met with, we have not yet seen anything even approaching our conception of the scenes of grandeur and beauty that might be worked out by the massing of roses either as a part of, or as an adjunct to, every large and comprehensive garden. If in the orginal plan of a garden it cannot be conveniently worked in with the general floral arrangement, then a separate piece of ground is set aside for the purpose. This I have often seen, and always found it a mast interesting spot. But apart from the immediate question, whether there is a separate rose garden or not, roses should be found plentifully in every general garden on account of the varied forms they are capable of, assuming, either naturally or by training. They are seldom out of place anywhere. What with dwarfs, standards and climbers, there exists ample material to adorn the most select position, or to obliterate the most awkward spots, bringing them into harmony with the general design. But what should the form of a rose garden be? I will give my ideas as briefly as possible.

— The Form of the Rose Garden.—

It should be formed, if possible, on level ground, with as many beds as the space selected will allow. Such beds should be four feet wide, planted with say two rows of plants, two feet apart, and a grass border three or four feet between beds will enable anyone to reach each plant to cut the roses without stepping into the beds. Such grass borders are very easily kept mowing them once a week with the lawn mower. At the same time this grass walk sets off the flowers to great advantage. With some fifteen or twenty beds with a double amount of well selected, best flowering varieties, say, forty plants in each bed, it will well make a very attractive collection. These beds may be in the form of a square or oblong. The rose garden can be made very attractive and artistic. All depends upon the gardener who has charge, or upon the landscape gardeners who have to make designs for a small bed or a regular rose garden. The rose garden should be surrounded with a border, three feet in width, which should enclose it, planted with dwarfs. A very light wire fence with a three-fourths inch post, with two or three wires a foot or eighteen inches apart, and planted with Crimson Rambler roses will make an excellent appearance from the distance.

— Pergolas and Terraces. —

A still further imposing scene can be obtained by forming a pergola, which can be easily constructed with three fourths inch gas pipe driven into an eighteen inch cedar or locust post, eight feet high with a cross on the top from one post to the other, with a grass walk between. Such a pergola should be planted with as many varieties as there are posts, or not more than two to a post, as with our progress in hybridization of so many valuable climbing roses the choice is at everyone's command, and the most gorgeous sights can be obtained of most bewildering beauty with plants that bring forth their blossoms at the same periods as the Hybrid Perpetuals, Teas or Hybrid Teas. Again a rose garden may be laid out on a terrace, as ours is located. There may be a bank sodded or sown with grass seed. But such a bank should be in full harmony with the rest of the rose garden and should be planted with trailing roses pinned down, making it a "bed of roses." It will add greatly to the rose garden. Good taste and art should be exemplified in every detail of a rose garden. We have a great many dwarf roses, like the Baby Ramblers and the Midget roses, that are used to form borders, especially around Hybrid Perpetual beds, to hide the stems and the result is one that will meet with delightful approval from every lover of rose gardens.

— Soil and Manure. —

Almost any soil will grow roses, as we see them in yards or gardens, providing a proper selection of varieties is made, and attention is given to the application of suitable manure. Roses, of course, enjoy a rich soil, but to keep adding cow, horse, and pig manure upon the naturally rich ground is not as beneficial as a change to nitrate of soda in the case of light soils, or lime for those that are naturally very close and stiff. This subject is therefore more a question of judicious manuring than selection. The Golden Rule is to add what the ground is most deficient in, and never to apply close moisture-retaining manure to a soil that is naturally stiff and moist. A very dry and sandy compost may easily be made suitable, by adding a few loads of stiff fibrous loam and clay, also by manuring with fairly well-rotted cow manure; while in many cases, by adopting the opposite plan, a stiff, poor soil may be worked into equally good condition. The ideal material is fairly stiff, not too wet, and not less than at least three feet in depth, with a good drainage, so that by heavy showers the roots are not left in water. With such well-prepared rose beds they can be enriched at will. Roses will thrive perfectly well for at least eight to ten years. After that time, if still in good condition, they should be gradually transplented in late fall, the plants well pruned out, suckers cleaned out, and the soil deeply dug and manured, and the roses replanted, when they will thrive anew and will last for many years. But we should never lose sight of the newer varieties of roses, using them to supplant such older varieties as have lost their usefulness. A wide-awake gardener or lover of roses will naturally keep up with the times.

— Pruning and Tying. —

The pruning of every class of roses is a very vital operation. All useless wood should be carefully cut out.

retaining only the good strong canes and Hybrid Perpetuals and Hybrid Teas are pruned alike, say, a foot from the ground alike, say, a foot tain the same height from year to year, as they should always, every year, be renewed with new canes and the old ones cut out. As to climbing roses the pruning is very different, as you keep five or six long canes around each post, these should be young as long as they cover the intended arch, or pergola. The old wood is cut, but sometimes we have not enough canes to fill the desired effect, and one or two of last year's growth is retained, and the side shoots are cut back to two or three eyes. The canes are then very carefully tied up with fine willows, as the European well-trained gardener uses, or with any other material as is commonly used, in such a clean way, so that strong winds will not move them from their holdings. The same operation is used to decorate a wire fence. As for the trailing roses, they are pinned down so as to cover well the bank with the low canes, and top shoots are cut back to two or three eyes. The pruning done the soil is at once loosed up carefully with a spade fork.

— Watering, Mulching and General Care. —

One thing should not be lost sight of, and that is, to have water close and conveniently at hand. As soon as the plants begin to bring up the growth of leaves, they need to be syringed nearly every day, to keep red spider, aphis, and green flies away in the dry season. This method has been followed with splendid success for many years. And when later the rose bug or chafer appears, slugshot is used with splendid effect, and having the water on hand, can easily be cleaned off before visitors arrive. There is nothing more inviting than to see a clean, well-kept rose garden with clean leaves and perfect flowers, but careful watchfulness has to be kept constantly over it. Give a good mulching with short stable manure of two or three inches thick, as roses like a cool footing, and this is extremely beneficial to excellent culture, preventing the soil cracking or drying off, and it is the means also of retaining good foliage and better perfection of bloom. And when the blooms make their appearance great care should be taken of the common enemy, the rose bug, which is a very troublesome one in most localities; they must be picked off and careful watch maintained. The withered flowers must also be carefully picked up, and no petals left on the ground. This is a strict rule among well-kept rose gardens. A watchful eye should be always kept on budded roses, as they often throw up suckers, which must be at once removed, or mischief will be the result.

Choosing Rose Plants.

In the first place, have a list of the varieties you have decided on getting made out ready before you go to the nursery, so that no time is wasted on that part of the business. There are some buyers who semm to have an idea that the nurseryman has little else to do but attend to them and the dozen or so roses they buy; and in this connection it must be remembered that he is a very busy man at this time of year, and time is money. Therefore waste as little of his time as you can possibly help, but he will not be two busy to help you in your selection.

Don't choose high standards, unless you want them for an especial purpose, such as to form the back row of a bed of standards. It will be found that 2 ft. is quite high enough for all ordinary purposes. This gives you all the advantages of a standard, but does not present so so much bare stem for the summer sun to exercise his strength on. The rose should have two "buds," that is, it should have been worked in two places. The advantage of this is that when worked in this way they form a good head in much quicker time. The amateur is very, very often tempted to choose a rose with a big head, in utter disregard of everything else, but I should advise him to err rather on the other side, and get one that has only made 5 or 6 in. of growth, as long as that growth has ripened. And, lastly, if you know nothing about it, get the nurseryman to prune your plants for you before you take them; it won't cost him five minutes of his time and will do you a lasting favor. This last point is one that is almost invariably missed by gardening beginners, who first select plants with the greatest amount of foliage, and then put them out in their gardens just as they got them from the nursery. It does not matter how carefully a rose is dug, there are bound to be a number of broken and fractured roots, and to equalise matters the branches must be cut.

All this seems a lot to do only to choose a rose, and one is inclined to ask, if this is all looked for—How long will it take to choose a dozen roses? In reality with a little practice it takes no time—a single glance along a row will show the very thing you want.

When buying climbing roses get the strong growing varieties on their own roots, or else dwarf budded, that is, worked on to a stock at the level of the ground.

Bush roses are not hard to select, only take care they are fair-sized, healthy-looking plants. These, like the standards, require careful pruning before being planted.

— Planting a Rockery. —

Reference is often made to the importance of making pockets of earth before planting a rockery, and it is just possible that some readers are not quite clear as to their construction and uses. Now, the pockets consist of small space between the rocks filled with soil, thus forming a suitable medium for rooting. Before planting there are, however, a few important details that must not be overlooked. To make a pocket successfully the work must be carried out much in the same way as one would proceed to prepare either a pot or a pan before putting in a plant. First of all, it is necessary that the bottom and sides of the pocket should be quite firm and solid, for, should there be any empty cavities, the soil would rapidly become dry, and there would also be a risk of the soil sinking more or less suddenly. When the pocket is low down in the rock garden, a good layer of some open and rough material, such as crocks, clinkers, gravel or stones, should be placed in the bottom for the porpose of carrying off the drainage water. Above this should be placed some rough loam, peat or leaf-soil to cover the drainage, and the top 6 inches to 10 inches may then be finished off loam. It is a common mistake to leave the soil too loose; it should be pressed down with the hands or rammed with a potting-stick as the work of filling the pocket proceeds.

Garden Notes.

PLANT HOUSES.

The ordinary greenhouse is not bright just now with bloom, but may be kept in a presentable condition by the aid of colored foliage plants. Zonale Pelargoniums are well suited with liquid manure in moderate quantities.

Cyclamen should be showing freely for bloom. Every one who has a greenhouse should possess at least a couple of dozen of these, for they are of great value in winter. The foliage is remarkably pretty, and their flowers are showy and fragrant. A good packet of seed, a little ordinary attention, and any one could have the plants on the way. It should also be remembered that age improves them, and the tubers will last many years.

Those who have a good collection of Coleus and only a cool greenhouse should either resort to hot manure frames, or remove them into the window of a well-warmed and lighted room in the dwelling house.

Keep the foliage of Palms and Aspidistras sponged to clean off scale insects or dust.

Brin~ Camellias in to expand their blooms.

THE NURSERY.

Put in cuttings, taking side shoots, about four inches long, cut off the leaves about two-thirds the way up from the base, and insert them in the sand to that same depth, pressing the sand closely and firmly against the bases and sides of the cuttings.

Remove Cinerarias or Chinese Primulas showing for bloom to the greenhouse. Pot any seedlings or rooted cuttings.

Pelargoniums of various sorts should be kept quite close to the glass, or they will rapidly draw up into weakly shoots.

Frames containing Show, Regal, or Fancy varieties must be carefully attended, and at any signs of green aphides appearing on the under sides of the leaves, a good fumigation with tobacco leaves or refuse should be given. Care must be taken that no hot smoke is forced among the plants or the effects will be disastrous.

Give liquid manure to all kinds of Pelargoniums if they are healthy, always remembering that sickly plants are not capable of assimilating rich foods.

Shake Hydrangeas out of the old pots, and repot them in moderately rich compost. Do not water them much now that very little growth is going on.

Tie up Freezia growths where they are beginning to bend over; a small stake should be placed to each one.

Hyacinths that have been potted some time ago will now be showing for bloom, and should, consequently, be removed to the greenhouse.

THE FERNERY AND SHADE-HOUSES.

Any one possessing a fernery with grottoes should now have a good look over the soil in the spaces between the rocks. It will

probably require scraping out and refilling, and replanting the ferns afresh.

Peat from some of the gullies in our hills makes pretty good filling, but it is better if not fresh, as it is then too sour and mudlike. Keep old fronds cut away, and ferns in pots should be moved from one position to another occasionally.

Any fronds infested badly by scales or mealy bug should be promptly cut off and burnt.

Keep the surfaces of beds, etc., stirred to prevent growths of liverworts, mosses, etc. Only apply enough water to keep the plants going. Care should be taken that no plants grow or stand in a drip from the rafters.

Thin out evergreen climbers that may obstruct the light. And it is a good plan to remove some of the battens or brush during the winter to admit more light. Do not pot up any ferns now.

Shrubbery Culture.

The outlines of shrubberies should not be too straight or formal, but irregular and natural. A skilled florist or gardener should almost conceive these ideas without instruction, but definite knowledge of the habits of the different shrubs to be employed is essential to enable one to make a planting which will develop consistently as they increase in age and size. That by observation and experience is evidenced by the very large number of inharmonious combinations that are seen in shrubberies all about the country. Probably rhododendrons are treated injudiciously qnd are a source of dissappointment and of waste of money more than any other shrub, largely through misunderstanding. Rhododendrons are sociable individuals, liking the companionship and protection of other plants. Their fine fibrous roots delight in cool, moist soil, but do not want to go very deep in earth to find these conditions, and are particularly sensitive to excessive heat or drought in midsummer. A situation where the shadows of large trees or building will shield from mid-day sun in summer and winter and from severe winds is an ideal position. A perpetual mulch of leaves renewed each autumn and with a light coat of stable manure on top of the leaves, to keep them from blowing away, is most congenial to them. Mulching and shelter from wind are the most essential conditions.—Horticulture.

Elder's Trustee Company.

Every year the excellent work accomplished by Trustee and Executor Companies is becoming more widely recognised, and, as natural, under such circumstances, the feeling against appoint,ng individual trustees is steadily growing. The advantage of entrusting the administration of affairs at death to a permanent company, with its necessarily experienced staff, instead of to the individual, who even if a pattern of probity is often sadly inexperienced, is so obvious that it must appeal to all who give the subject careful thought. The wisdom of such a course is equally true whether the estate be great or small — in either case the testator wishes the very best to be done as regards careful administration. It is an open secret that many of the wealthiest men in South Australia today have made arrangements for their estates to be administered by trustee companies, and some of them are amongst the foremost in commercial circles—men whose business acumen is well known and whose judgment can be relied upon. On the other hand the testator whose means are limited for that very reason is most anxious that the property he is able to leave for the benefit of his heirs should be most jealously safeguarded. On this point men of both large and small means are agreed, and apart from this aspect of the case they are rapidl coming to the conclusion that it is not fair to thrust such responsibilities on the individual. The point of view of the latter is also worthy of consideration and it is undoubtedly a fact that if individual trustees only knew the penalties and responsibilities to which they subject themselves that they would decline to act in such a capacity. The subject is one that cannot be wisely ignored, and no man possessed of any property at all should fail to make provision, in the most adequate fashion, for those near and dear to him and dependent on him. Any person unfamiliar with the workings of trustee companies cannot do better than consult Elder's Trustee and Executor Co., Ltd., when the fullest particulars will be forthming. The company, which is associated with the well-known firm of Elder, Smith & Co., Ltd., has an authorised capital of £500,000 and the names of the geotlemen comprising the directorate are in themselves a guarantee that the interest of those who entrust their affairs to the company will be thoroughly safeguarded.

A strip of flannel or a soft napkin folded lengthwise, dipped in hot water and wrung out, and then applied around the neck of a child that has the croup will surely bring relief in a few minutes.

Shade Trees.

There are very few people who have not had occasion, in one way or another, to feel an appreciation for shade trees. However, the most of us should have more than this casual appreciation. We should know more of its physical properties; the adaptability of certain varieties for certain conditions and above all wider knowledge of the species and varieties with which we come in contact from day to day. Some of us are content to make an appeal for trees for no other motive than that of the esthetic—the sentimental appeal. This does very well in some communities but it does not affect the business man. The love of nature, of art and things beautiful cannot be fostered in every mind. It may be stored there somewhere but to bring it out the practical side of the thing proves its discovery. It is often the question of dollars and cents to the individual or the city. If that cannot be shown the tree enthusiast generally get a shock. Before our cities, towns and villages pay the necessary attention to street trees other values than that of the beautiful will have to be felt. If those who now give little attention to trees could find it practicable to visit towns and cities made famous by their trees and parks a great proportion of the present indifference would be eliminated.

When a man finds that his property is worth far more today that it was a dozen years ago owing to the growth of one or several beautiful trees on it, he appreciates the tree or trees, withour doubt. The owner may have never given his trees a thought until this cash value idea forced itself upon him. How much greater would his appreciation have been for those trees is he had learned to feel them a part of his home and an asset to his everyday happiness?

Trees, then, must have more than a few appealing features to arouse general interest and when these are enumerated it will be plainly seen that they have. In passing along a city street during the hot summer months with the mercury at 95 degrees in the shade haven't you often sought the spot shaded by a noble tree, where the direct rays of Old Sol, either beating down direct, or reflected by reflection from buildings, are intercepted? Have you not lifted your "straw" from your sweltering brow and offered up a little inward prayer for this same tree?

Then again we find that trees prove to be sanitary agents. Through their leaves poisonous gases, which are apt to prevail in congested districts, are absorbed. Where civic and village improvement societies have accomplished results, this fact may not at once appear significant but in many towns that the writer has visited where garbage, etc., has been allowed to remain in the streets until a kindly rain has washed it away every agency which would tend to eliminate the foul, poisomous odors would certainly seem a blessing. Tree roots absorb superfluous water which would otherwise make our basement and cellars damp and unfit for the storage of fruit and vegetables. Soil aeration is another factor to thank roots for. The opposition will say that tree roots often displace curbings and walks, yes and pavements. Why? Because these same trees were not properly planted. No root can penetrate some of the hardpans found near the surface of many of our streets. Before putting in permanent walks where beautiful trees exist it would pay towns and cites to see that the tree roots are going to have ample room to develop in penetrable soil.

The cities, towns, villages and districts famous for their trees too little appreciate what nature has done aided by man. There is little done to preserve, and hand down to posterity, the blessings they are at present enjoying. The trees should be watched like children. Over in France the city of Paris spends thousands of dollars in supporting a Tree Hospital. Trees are sprayed, fertilized, pruned, replaced when beyond their usefulness and protected in every way possible from injury. The whole city takes a living interest in its trees. They are proud of their well-shaded avenues.

We cannot lay back and let Dame Nature take care of our beautiful trees. They will not last forever unaided and not even then. It is our duty not only to ourselves but to those who follow to protect the trees we already possess and provide others for coming generations,—living monuments of a thoughtful people.—P. J. Williams, Alabama Station in Horticulture.

The Yucca Gloriosa.

In the Yucca family we have several most useful plants for the shrubbery. They are chiefly native of Mexico, Jamaica, and the southern United States of America. The plants resist drought and they are not fastidious regarding the soil they are in. There are but few species of Yuccas, and they are generally called "Adam's needles." They are also sometimes known as the "Spanish dagger," and also as the "dagger-leaf" plant. They are easily propagated by suckers by cuttings, and also by seeds. The plants bloom at irregular intervals, and one cannot always predict when a plant will bloom. A dozen specimens may be in flower all at one time or upon another occasion the blooming period may extend over several months. Yuccas are excellent seaside plants. They do very well also inland, and, except in very cold localities, are hardy in most parts of Australia.

An American gentleman, writing in the "Journal of Horticulture" gives an interesting description of Yucca gloriosa. He saw a plant of it in bloom in England, and it put him in mind of the wilds of his native country, Florida. He says that the spike-needle of this plant is used to this day by the more dressy Red Indians in the stitching of their fancy aprons. It is supposed this is the plant used by our first parents to stitch the first garments of our race in the Garden of Eden. It is stated that this plant does not seed in Europe, and this is said to be through the absence of a certain moth, the Promoto yuccasella. If this moth did not exist the Yucca seed would not be fertilised, and if there were no Yucca plants the larvae of the moth would die of hunger. These moths do not exist in Europe, and therefore the plants do not seed. The naturalist may say whether the moth was made

for the plant or the plant for the moth, and which produced the other.

The writer in question refers to the large creamy-white, bell-like blossoms, which are arranged in panicles. The five wax-like petals enclose a wonderful ovary, which, in addition to its ordinary function, is an incubator for the moth deposits its eggs here, and when these have reached the cocoon stage, after having been nourished by the ovules, they let themselves down from the flower by a gauzy thread, and lie among the foliage at the foot of the plant for a year, at the end of which period they develop into moths, which, in turn, repeat the life history. In Florida, these moths may be seen as soon as dusk falls, flying from flower to flower, and shedding a strong metallic radiance around, and thus warning the barefooted Indian of the perilous spikes in his path. These moths have a singularly constructed trunk, provided with teeth, with which collect the pollen and roll it into hard, perfectly formed balls, which are then deposited upon the stigma of another flower. These golden balls are much prized by the Indians in some parts of America, where they form the current coin. The writer wonders whether the three golden balls of the pawnbroker have anything to do with the golden balls of the pollen of the Yucca, so much valued by the Indians.

One of the finest of the Yuccas found in Australian gardens is Y. aloaefolia variegata; T. quadricolor has beautiful var egated foliage; Y. filzmentosa is a dwarf-growing species, so named from the thread-like filaments of the foligge; Y. recurva pendula is also a fine species of these really useful plant. —"Australasian."

The Rose in Floral Work.

Acknowledged queen of flowers, the rose lifts itself in mighty grandeur above her exquisite but less pretentious sisters of the soil, and for her sweet innocence and ever readiness to mingle with them we bow our tenderest respect and compliments.

We do not speak slightingly of all else of Flora's kingdom when lauding the charms of the rose, as each flower in turn can boast its votary, and justly so, as the blossom devoid of beauty and without an admirer is unknown. In its willowy grace and loftiness of mien the rose may be depended upon when displayed with its kind, only, to produce results in the matter of natural charm not to be obtained by the clustering of blooms of any flowering plants not embraced in its class, and it is conceded the rose is in a class, alone. Unselfish by nature it is willing at all times to go hand in hand with a companion of different type, even though its adaptability to such combinations is comparatively slight.

In company with carnations the rose loses its importance, while the carnation itself appears to suffer, the latter being more at ease unaided the former.

There are opportunities, nevertheless, for roses being used to advantage with other flowers as floral emblems be they fashioned for the living or the dead.

A bridal bouquet of white rosebuds embellished with a few orchids at one side is beautiful as it is popular. There are other instances where the rose may be used in connection with other flowers with excellent effect. What is most desired in the use of roses is an avoidance of commonplace combinations, such as roses and violets, roses and gardenias, roses with sweet peas or lily of the valley; in fact with any small flower in the construction of corsage bouquets, small flowers being infinitely better alone than when in company of the rose, whose preeminence enables it to stand alone in the fulness of its dignity.—Horticulture.

Sowing Small Seeds.

Most country settlers, as a rule, have several old powder canisters lying about the place, which, as a rule, as soon as they are emptied are thrown down and entirely discarded. Gather these up carefully and fit them nicely with corks; then bore a hole through the centre of the cork with a stout nail or any other implement, after which, get some of the stoutest feathers from either a goose or a turkey's wing; cut the quill about 2 or 3 in. from the base, insert the pointed end through the cork, and draw it through till the other end is flush with the end of the cork; then cut the tip off, and see that there is no obstruction in the quill.

Fill your canisters with the various kinds of seeds, label them, or place some distinguishing mark on them, and then place the corks with the quills into each tin, and as occasion requires proceed to use them; and it will be found that after opening out the rows in the usual way by gently shaking the tins held in the horizontal position the seed will drop out in a thin, even stream, thereby saving an immense amount of seed and a lot of trouble in after the runnings out.

For peas, beet, etc., the same method can be persued, with the exception that no quill is required, and when using take the cork from the tin, and shake the tin as before. The same device will also be found to economise greatly when sowing broadcast, although it is hardly so effective then.

Old Carnation Plants.

Old carnation plants, three or more years old, may be renovated in the following manner:—Dig out the whole plant, injuring the roots as little as possible; manure the spot where it was growing by digging in cow or sheep manure, and then replant two inches or so deeper than it was in the first place, spreading out the branches and covering them with soil. Then give a good watering. Each of the branches will then form new roots, and you will practically have as many young plants as the bush has branches. The same end may be gained by simply spreading two or three inches of fresh soil over the crown of the carnation and keeping it damp by judicious watering, but the first plan suggested is the better as it enables you to manure the soil beneath the plant.

Fruit Garden

Notes for July.

— Pruning. —

Pruning has two objects :—

1st, To form the tree and regulate its shape and growth.

2nd, To promote and regulate fruit bearing.

The first named object of pruning is, of course, important; but only in connection with the second, for one cannot conceive of a man desiring to grow fruit trees which can neither bloom nor bear fru;t. If a man will let a peach or an apricot tree absolutely alone it will, as a rule, bear plenty of good fruit from the third to say the eighth or tenth year. If he then chops or saws it off and lets it grow again he will lose one year and then have plenty of fruit again for a further term of years. This will be a very barbarous way of growing fruit but it is infinitely better than the plan followed in some of the gardens, and it is better than allowing the trees to grow straggly and half dead as old uncared - for trees naturally do.

— Keep the Ceotre Open. —

In pruning all trees, keep the centre open, so that there may be a free access of sunlight and air, for without these neither foliage nor fruit can develop. While the trees are bare look carefully at them and remove bodily any limbs which fill up the centre. Saw them cleanly out, smooth the wound with a knife, and if possible tar or paint the surface to preserve the wood and facilitate healing. If several large limbs are thus cut out the remainder of the tree can in many cases be left alone to carry a crop, because the fact of having removed a good body of wood will be enough to provide for the development of new wood.

— Thin Out Old Pear Spurs. —

In dealing with old apple and pear trees it is wise to thin out the old masses of spurs, and thus permit of the strength of the tree being concentrated into the buds which remain. A spur with twenty blossom buds might well be reduced to ten, and one with ten to five, with advantage to the resulting crop of fruit.

It is perhaps well to tell the amateur that peaches and apricots bear on new wood and apples and pears on old spurs, and pruning should be regulated accordingly.

— Peach Aphis. —

In July the peach aphis begins to appear on the young wood of peaches. Spraying with one of the oil emulsions is said to be a complete cure. If it is considered necessary to attack them below ground, the grower is advised to open up the soil round the base of the trunks of the trees which were affected last season, and pour in a gallon or two of soap suds and tobacco water. Then watch for the first appearances on the twigs, and either cut them off and burn them carefully or drop them into a bucket of water on which a spoonful of kerosine has been poured. If you do not care to cut off the twigs, and sometimes it is not desirable, have a small tin of tobacco water or kerosine emulsion and brush the twigs with a paint brush. The rubbing with the brush and the kerosine together will destroy the colony, and is less trouble than spraying for the first attacks. Give the roots another dose of tobacco water and suds, and keep watch. The important thing, is to prevent the aphis from getting a start. Once let the aphis get ahead, and thorough spraying or fumigation is essential.

— Peach Curl Leaf. —

The remedy, or rather the prevention of curl leaf depends on the effectiveness of the spraying with Bordeaux mixture. The work should be done before the buds open, or rather, just when they are beginning to open, and again when they are opening.

— Grafting. —

Blight - proof stocks for apples should be worked at the end of the month or early in August.

Scions, that is, wood for grafting, should be cut now and well heeled in under the tree or labelled with zinc and bedded in moist sand. It will then be ready for use when required up to September.

The grafting of old trees should be done when the sap is rising. If the cleft graft or the whip and tongue graft is used, the work is generally done early before the buds open, but if any form of bark graft is used, the operation must be delayed until the sap is sufficiently active to allow of the bark being readily lifted. For small stocks, say, up to an inch the whip and tongue graft is perhaps the best : but for trees over that size I like same form of bark graft.

— Citrus Trees. —

It is best oow to wait until the weather is warmer for planting out orange and lemon trees, but I think it is well not to delay until the young trees begin to grow.

— Planting Almond and Cherry Trees. —

It is well not to delay planting out almond trees, for they will begin to bloom at the end of July, and it is well that they should be in the ground before the buds swell. If it is not convenient or the ground is too wet to plant out trees, it is a good plan to heel them in well and shift them several times. This prevents their starting to make root growth, and keeps them io a dormant condition until they can be planted.

Novel Treatment of Peach Trees.

Experiments made at the experimental station at Bologna (Italy) have shown that by removing the bark in rings from the branches of peach trees the fruiting is greatly encouraged, and the fruit is finer and ripens more quickly than those of trees not so treated. The tree is not injured by this operation, and the fruit is even more firmly attached to the branches.—Queensland Agricultural Journal.

The Apricot.

— Pruning at Planting. —

When the trees are in position their tops should be removed, and a stem of 12in. or 15 in. left for the future tree. During the first three months of the first season's growth the apricot requires considerable attention as regards its formation. Each branch should start at a different height, so as to avoid forks, for the trees are liable to split at their forks when heavy winds are experienced. To this end the young trees should be examined every week or ten days—the oftener the better—and all buds that would make growth that is not desirable should be rubbed off with the fingers, and with attention the trees in the orchard may be made of uniform shape. The rubbing-off of the buds needs to be done intelligently. On examining each tree the buds that are already forced out, or likely to be forced out, should be noted, the object being to allow three or four—three by preference—set stepwise to remain, and these should be retained in such a position as to evenly distribute the future main limbs around the tree, so that the head will be thoroughly well balanced.

— Winter Pruning. —

In pruning the apricot both skill and judgment are required, and, perhaps more than any other tree, the apricot suffers from neglect of annual pruning. The object of the first two or three years' pruning should be to secure a well-formed tree, capable of carrying its future loads of fruit, rather than with a view to immediate profit. After the first year the objects to be kept in view are to give strength of limb, to insure sufficient new wood to produce abundant crops of excellent fruit without the overcrowding of the branches, and at the same time to maintain the spurs in a vigorous state of growth. The natural habit of the apricot is to throw out out needlessly long shoots, and these must be shortened back severely at every winter pruning, or, if this is neglected, the tree will become like most of the peach-trees, denuded of young bearing-wood in the interior. The apricot carries its fruit on the spurs thrown out from last season's growth; it has fruit and wood-buds mixed on the shoots of one year's growth, and it has also little fruit branches or spurs like the plum, which are capable of being renewed by shortening. The points to be remembered in pruning are these: to keep the top well headed down; to cut back the laterals to 3 in. or 4 in., thereby converting them into fruit-spurs which will bear fruit the following season; again, shorten back the spurs as they lengthen and become enfeebled, thus forcing the sap towards their base, thereby renewing them. The judgment of the grower must be exercised; he must consider the character of the soil, the climate, and the variety he is growing. In some places the tendency of certain varieties is to make wood too rapidly whilst in another place the growth is much slower. Pruning must thus be adapted to circumstances; but, presuming that the tree has been planted and pruned in such manner as to form a well-balanced head, with branches three or four in number, the second year's pruning would then consist in heading back the vigorous growth of the first year to 12 in. or 14 in. In examining the tree at the third winter's pruning, you will notice at the end of each shoot that was cut back at the previous winter two and sometimes three or four strong shoots. If three or four shoots have been thrown out from each branch, one or two of these should be cut clean away, and the rest shortened to a quarter or a third of their length. Those retained should be well apart—avoiding forks—and they should not be left so as to interfere with any shoots from the next branch. The object should always be to retain the limbs equidistant from one another, as far as that is possible. It is not desirable to have too many limbs, as when the fruit-spurs are thrown out all those over 2 in. or 3 in. in length are shortened; these spurs will not only carry fruit, but throw out spurs from the terminal buds, and if these are properly treated they will continue healthy and vigorous, and will bear fruit for many successive years.

Publication Received.

Though written for English conditions, and to English time there is much of interest in this volume before us, "Gardening for the Ignorant." It is written for those who know little of gardening, though hardly perhaps as destitute of knowledge as the Scotch lady mentioned in the preface who said to someone who was admiring her flowers "Ah! but, Doctor, ye ken the Latin names of the flowers, I ken but twa, and they are just Aurora Borealis, and Delirium Tremens. It enters freely into simplest details, and has many helpful suggestions which are usually considered not worth while by more ambitious writers of the subject.

Amongst the many advantages of gardening, its helpful influence on mind and body, takes an important place, and the authors, who, by the way, are two lady amateur gardeners, very truly say, "That the actual work of gardening, as far as it is within one's power to accomplish it, is far more interesting than merely giving directions, and watching the result. This is, indeed, the keynote of the pleasure of gardening. Our copy reaches us from Messrs. McMillan and Co., and the price is 1/-.

Fertilizers and Fertility.

— A Paper read before the Society of American Florists. —

Few phases of scientific investigations are of greater interest, or hold forth more promise of profitable results, than the studies which are being made in regard to the fertility of our soils and their conservation. To the gardener the subject is of prime importance, whether his work be in the open field or under a roof of glass; whether engaged in the growing of the primary food products, or in the production of materials for decoration and the expression of the higher aesthetic feelings of mankind.

That we are still in the experimental stage of agriculture can hardly be denied, though we are slowly approximating to a scientific basis. Theory and practice are often at variance, probably from a misunderstanding of the meaning of the facts before us. These differences will in time be eliminated, and our practice will constantly become more exact. That we still have many things to learn about our soils and their relation to plant life goes without saying, but at the present time I think we are not all making the best use of the knowledge which has accumulated on these subjects.

In this paper, today, will be found little that is original, but rather an attempt to collate and place before you some of the more striking facts and theories current at this time.

In these days of extensive gardening, all questions relating in any way to the supply and assimilation of the elements of fertility are of vital interest, as upon their correct solution depends the final profits or loss.

In order that we may discuss these matters more intelligently, let us briefly review some of the fundamental ,acts which underlie the subject, as well as some modern theories of fertility and assimilation, and the relation of various factors which enter into the problem of plant growth.

The great bulk of plant tissue is made up of starch, cellulose and water, with a small amount of proteids or albuminoids. These reduced to their simplest terms mean carbon, oxygen, hydrogen and nitrogen, which together with potash, phosphorus and a little lime and sulphur, make up the list of essentials. Carbon oxygen, hydrogen and nitrogen in gaseous condition are everywhere present in the atmosphere, while potash phosphorus nad lime and sulphur are found to a greater or less extent in most soils, and are the elements which become exhausted and have to be renewed. Of these latter elements sulphur may be omitted, as it, like some other elements of minor importance is usually found in sufficient quantity.

Of these substances the most expensive and at the same time the most evanescent, is nitrogen. The soil will not hold it; it is here today and there tomarrow. It is inordinately fond of fresh fields of activity, and so impatient of confinement that it has to be constantly kept at work, and watched lest it escape into the atmosphere from combination which secretes it and deprives the plant of its services.

The usual sources of supply for fertilizing purposes are from animal substances, stable manure and from natural deposits of nitrates.

Potash is a more stable element, though likely to be lost by leaching, and is obtained in commercial quantities from wood ashes and from the nitrates and sulphates.

Phosphoric acid is commonly bought in the shape of ground phosphatic rock, from bone, horn, hair, from fish and from basic slag. These three elements have been called "The tripod of fertility."

From whatever source these elements are obtained, they must be soluble in water in order to be available to the crop. Potash and phosphoric acid can be applied to the soil at any time, and the loss from leaching or otherwise is not very serious, while any surplus beyond the present needs of the plants will be retained for future use; but nitrogen applied in excess is, as a rule, nitrgen wasted, and as we have seen, this is an expensive fertilizer. This leads us to the theory, which has the support of good practice, that nitrogen should be applied in small quantities, and often rather than enough at one time to perfect the ceop. There are combinations of nitrogen, however, as in stable manure and animal matters, which require time to unlock and render available. Such compounds may be applied in larger quantities some time previous to the planting of the crop, or a time allowance made to enable the proper forces to tear the combinations apart, and render nitrogen fit for assimilation.

(to be continued).

Drainage.

The question of drainage on Orchard land is one which is considered of increasing importance. Many benefits are claimed by the advocates of under drainage, and in many cases it is of course essential that the work should be done. It is not often that one finds a practical orchardist who dissents from the main proposition, that drainage is desirable. A correspondent to the "Farmer and Grazier" however, holds somewhat unusial views on the subject. We reprint his articale as follows :—

"A matter that wants revising, according to Australian experience, is drainage. To read the European authorities that are so often quoted here, soil drainage appears an unm xed good and a most profitable investment. It is said to remove surface water from surface and subsoil; to

ncourage fertility; to warm the soil and dry it; to lengthen the season of tillage; and many more fine things besides that may all be right in a moist climate, but have very little relation to things as they are over a large area in this country.

— Surface Drains. —

However they may operate under a mild, steady rainfall, subsoil drains are practically useless for carrying off our heavy storms. If the ground is worked and on a slope, the heavy shower makes a channel for itself, and tears downhill in a flood, carrying with it hundreds of tons of soil, and this though the land may be preforated with drain pipes. In orchards various plans meet this difficulty with partial success. The land is only worked one way, across the slope. Strips of grass or permanent crop are left. Slabs in a row are fixed in the ground, like a garden border, so as to check the current at every row of trees. Some kinds of clay do not wash easily; these are filled in the washed-out places. Yet with all these contrivances, or some of them, great damage is still done by torrential rain.

— Subsoil Drains. —

If you have a bog, or a permanently sour patch of ground, there is no question of the advantage of drains; but if your subsoil is at all porous, and often when it is not, local experience goes to prove that subsoil drainage is mostly a useless expense. And this is easy to understand if we consider the main purpose of these drains, which is by carrying off the subsoil water to allow access to the air. But our soil for the greater part of the year has no subsoil moisture to speak of. Stiff soil is cracked by the heat for great depths, allowing the atmosphere free access. Light soil, from its nature, also allows the air to enter in a dry time. It results that the chief end of drainage is not required. The writer has seen hundreds of pounds wasted in this way. He can show an orchard, half drained and half not, and the undrained portion gives the best results. He can show several orchards scientifically drained that proved failures, others undrained that have flourished. It is not suggested that the orchards failed because they were drained; but simply that in most cases subsoil drainage has little to do with orchard results. At the same time, there are few orchardists that do not find by experience and the colour of their trees, that an odd drain here and there is wanted for special places. An examination of such cases will generally show that the soil in that part is held in an underlying basin of rock, clay, or shale, that requires a channel cut through it. That is all; nature in our climate will do the rest.

— Trenching. —

Closely allied in theory to subsoil draining is that of trenching; both plans help the air in a damp climate to penetrate more deeply in the soil, and every system of tillage has the same object. But if the air, owing to climatic reasons, penetrates deeply by a mere surface scratching, then it is evident that trenching and other expensive deep culture is so much waste labour. And local results go far to confirm that opinion. The writer has a neighbour, who with great labour, trenched half his kitchen garden two feet deep; the other half, for lack of time, he simply dug nine inches. To his surprise and disgust, one half of the graden bears crops equally as good as the other. I know of land 30 years ago trenched for orange trees, one acre two feet, the other acre only a foot, because the solid rock was met with. The trees on the foot of soil have done better than those on the two foot. European experience is unanimous that you must trench for grape vines—trenching here costs about £40 per acre. Our vignerons, except in moist places, find a nine-inch ploughing costing, say, 10s. per acre, answer all purposes. All these facts, and many more that could be added, go to show that European agricultutal or horticultural experience is of doubtful value for local application. And it is just this kind of experience that is quoted so freely in the agricultural columns of our press, leading to immense loss of time and money by deluded readers.

— The Australian Plan. —

The theory of drainage, subsoiling, and trenching is sound in England. It is no doubt the best plan there to aerate the soil; but to achieve the same end here quite a different process must be followed, and that is to scratch the surface; break the crust that always forms after a few days on well-worked soil. Then under our conditions the air penetrate freely and deeply. There is good reason to suppose that much of our second, third, and fourth ploughings, might be profitably superseded by as many more harrowings or cultivatings. A pair of horses will plough an acre in a day, or cultivate six acres. Those who will change the first process for the second on all possible occasions will find their advantage. Give three cultivations instead of a second ploughing, and you will save half your time, and have better results. I notice on one of the most prosperous Hawkesbury farms where corn is a crop in the driest seasons, the cultivator is always going up aod down the rows; or the harrows over the crops till their height stops the process. I notice in orchards that in praportion as they are harrowed or scuffled, so do they prosper and succeed. In orchards, after the first planting, we have abolished the plough altogether; how far farmers may do so I cannot say, but I am certain that in their case more and constant surface scratching would lead to profitable results.

Pruning the Peach and Nectarine.

These trees give best results when formed with low heads, and as they make very strong growth they will in consequence require very hard pruning for the first five or six years. The first year's pruning in orchard should consist in cutting back, leaving only three or four main arms without any laterals. Second and third years they will require care and guiding. As it gets older it must not be allowed to grow too thick, and to avoid this a certain amount of thinning out and pinching back will have to be done; but I do not approve of summer pruning these trees too severely, as I have found, from my personal experience, that we have obtained far better results where only a moderate thinning of shoots and very light summer pruning with a good winter pruning were given. With most varieties of peaches and nectarines, the tree, as it g?ts older, must not be allowed to grow too thick in the centre else that which should be good fruiting wood will never properly develop owing to the density, and will, in consequence be barren of fruiting buds; therefore, the grower should see that the centre of the tree is just open enough to have sufficient light and room for the wood to develop properly. Then, at the time of winter pruning, many of these shoots will have to be removed altogether, others cut back, leaving about six fruiting buds on each shoot. The more fruiting wood left the more fruit will be set, but the size and flavour will be poor, and the value of the fruit when marketed will also be poor. To grow good fruit, too much fruiting wood must not be left. The grower himself will be the best judge as to the carrying capacity of his tree.

To sum up, winter pruning consists of shortening in or cutting off half of last year's growth all over the tree, cutting out any sickly small wood which did not mature, thinning the strong shoots out where found to be too thick, and leaving only the required number of shoots distributed evenly over the tree, at the same time performing the work in such a way as not to destroy the balance of the head. By reducing the wood one-half we reduce the coming crop by half (in numbers not in pounds), as the peach and nectarine always bear their fruit on one-year old wood; thus the remaining half will be of better size and quality, and of greater commercial value.—Extracts from W. J. Allen's "Pruning," Department of Agriculture, N.S.W.

Preparation of Red Oil Emulsion.

Add 2lb. of soft soap to 1 gallon of soft water, and boil until dissolved, after which add 2 gallons of red oil and bring to a boil. Emulsify by either stirring rapidly, or by placing the nozzle of a spray-pump in the mixture and pumping quickly for a few minutes until it emulsifies. Dilute in the proportion of 1 in 30, or make the whole up to 60 gallons.

When first made it looks something like cream. The strong emulnsion should first be placed in the spray-barrel, and then the required amount of water for diluting added.

When the weather is very cold the water for diluting should be warmed; otherwise the mixture is liable to turn into a jelly.

In applying this solution through the pump, considerable force must be used, so as to ensure the mixture reaching into all crevices where any insects might be sheltering; and see that every part of the tree is covered, as if even a few are missed, they breed very rapidly. If any live ones are found on the tree after this treatment, it may receive another spraying, or, if only a few are found, the infested parts may be painted with the emulsion, using a brush for the purpose.

Care should be taken is mixing to see that the oil does not come in contact with the fire, and the work is done in the open to prevent any possible chance of setting fire to any buildings.

Spray-pump and hose should be well rinsed in hot water directly after being used, as the oil attacks the rubber.

White Ants and Peach Trees.

When the peach trees get old, and decay sets in about the roots or main trunk, if there are any white ants in the vicinity they will find their way into the trunk and soon gnaw the centre out, gradually extending their passages up the main branches, and when a heavy wind-storm comes it is no uncommon thing to see half-a-dozen large trees minus a limb or two. This is the species that is always found at this work in the neighbourhood of Sydney, and the soldier can always be identified by its smooth scythe-like untoothed jaws, with the curious habit of ejecting a globule of milk-like fluid from a chamber in the front of its head, as a means of defence when captured. The winged or perfect form of this species is a slender chocolate - coloured inset, with slender, rounded, blackish wings.

— Treatment. —

Cut out all dead branches or dead wood at the roots, and treat with tar-water; burn all dead wood or sttumps near the trees, which are only likely to harbour the white ants. Above all, endeavour to find and destroy the permanent headquarters or nests, with the queens. Egg-laying is then over, and the white ant colony will speedily perish, there being no young ones to take the place of the matured ones as they die.

Dig in several pounds of Kainit above the roots of infested trees.

Raising Orange Trees from Pips.

Reply to R.M.—The pips for growing orange stocks should be taken from seedling oranges, as these are said to make the best and most vigorous trees. The pips may be allowed to remain in the oranges until the warm weather in spring, when they are taken out and planted in a bed prepared as follows:—If the land is heavy get sand and mix with the soil, to which add, if practicable, one bag of well rotted sheep manure to

y bed 4 ft. wide by 8 ft long. at care should be taken to get manure, soil and sand thoroughly ed.

lant the pips about 3ins. apart to epth of three-quarters of an inch, r which mulch the top of the s with well-rotted, dry, fine man- scattered over the top to a depth a quarter of an inch. This should watered with a fine rosepot every er day unless the weather be very and hot, when it should receive ood sprinkling every day. The s should be protected from the sun using frames raised from 12 to 18 above the bed, and covered with sian or light brush fastened to n, so that the beds are sheltered n the driest rays of the sun, which ild possibly burn off the young its as they show above ground. the seedlings grow, the covers can dually be discarded, until at length plants are robust enough to re- e no further shelter. The latter t of September is a good time to it the pips.

linen towel folded several es and dipped in hot water. ckly wrung out, and applied er the site of toothache or ralgia will often afford prompt ef. This treatment for colic been found to work like magic. rdinary headaches almost al- ys yield to the simultaneous plication of hot water to the t and back of the neck.

White Ants.

In every colony there are four forms—males, females, soldiers, and workers. The males have a pair of compound eyes placed just above the antennal fossae, and when young two pairs of large membranous and approximately equal wings, projecting beyond the apex of the abdomen when at rest. They live permanently with the females. The females when young closely resemble the males, but later, when they become mothers of colonies, this resemblance is not so close. The soldiers are sterile, wingless, and usually blind. Their heads are chitinous, strong, and peculiarly adapted for defence. They act as protectors of the colony, although occasionally assisting the workers. The workers are sterile, wingless, usually blind, but little chitinised, having short and powerful jaws, and larval in appearance. They attend to all the duties of the colony, such as building the nests, caring for the young, and ministering to the wants of the queen. All except the migratory winged forms are incapable of enduring sunlight, as the soft delicate bodies of the other forms shrivel when exposed, and, consequently, all their operations are done under shelter.

At the time of the nuptial flight, the winged forms emerge in pairs, and, under favorable conditions, each pair may establish a new colony, but as they are preyed upon by many insectivorous animals, this rarely happens. As soon as a king and queen have established a new colony, they superintend the rearing of the first brood of workers and soldiers until these are able to assume their special duties in the colony. Henceforth, the queen loses all power of locomotion, is constantly fed by the workers, and her size increases considerably. She now becomes an egg-laying machine, laying many thousands of eggs per day. When any accident befalls the queen, a "supplementary queen" is developed from a very young larva, being smaller, however, than a true queen, but serving the purpose of egg-laying equally as well.

As so many of the colonising forms are destroyed during their nuptial flight, the more usual rule of the formation of a new colony is the splitting up of old colonies. As methods of prevention, and remedies against white ants, the following may be mentioned:—(1) Coat all foundation timbers with tar. (2) Build the foundations of buildings entirely of brick, stone, or concrete. (3) Fumigation with hydrocyanic gas at the strength of 1 oz. of potassium cyanide per 100 cubic feet of space. (To make this gas, the required number (x) of ounces of potassium cyanide is weighed out; to this is added twice the number (2x) of fluid ounces of sulphuric acid, and four times the number (4x) of fluid ounces of water.) Fumigate in a tight room to which access cannot be gained during the operation, as the gas is a most deadly poison. After the room has been closed, put the acid and water into an earthenware vessel and drop into it the cyanide contained in a bag attached to a string which runs freely through a keyhole. After fumigation has gone on from one to two hours, open the room from the outside and allow it to air for not less than six hours before entering.—"Agricultural News."

Tomatoes can be used for jam, made as follows:—Scald and then peel the tomatoes. Boil an hour with sugar while stirring. Next add the juice of a lemon and let boil half-an-hour longer to thicken. Finally pot. For one pound of tomatoes there must be one pound of sugar and half a lemon. The jam is excellent, and very like red currant, especially when care is taken to strain out all the pips.

Manures for Fruit Trees and Shrubs.

Soils cannot retain fertility unless they are able to supply all the requirements of the plants that grow in them. And not only is the presence of sufficient quantities of the essential materials necessary, but they must also be in soluble form, so that they can be taken up by the roots of the plants. Though a soil may contain lime, potash, phosphoric acid, and other essential minerals in abundance, yet it will remain more or less barren if these substances are in an insoluble condition. Water and air are the chief factors in making the soil materials soluble, and the working of the land helps to effect this purpose. But when there are still deficiencies, or the materials become available too slowly, the cultivator must assist with the help of manure. There are two classes of these stimulating materials, one being known as general and the other as special manures. General manures are those from the farm-yard and stable, and contain a mixture of solid and liquid matter from animal excreta and the decaying straw or other material used as litter. These manures contain a variety of fertilising materials, and also have a useful mechanical action upon soils. Their use materially conduces to the fertility of soils, and they may be applied with advantage to all classes of land and crops. In most localities, however, the supplies of general manures are very limited, and but few cultivators are able to use them extensively. Another drawback is that they are bulky for carriage and handling, which adds materially to their cost. Special manures contain only one or two essential constituents of plant food, and are a very useful class, as they can be utilised economically for particular soil deficiencies. The principal of these fertilisers required in fruit culture are lime, bone-dust, superphosphate, guano, potash, soda, and magnesia. But though these special manures are effective and economical when judiciously used without some knowledge of the land's requirements they may be wasted, and in some cases may do more harm th[an] good. It is not well to apply lime to land that already contains an abundance of that material, or potash to soil that is naturally rich in that mineral. Though these fertilisers can be used profitably when the soil deficiencies are known, they may be wasted otherwise. Some fruits, such as the grape, olive, pear, plum peach apricot, and cherry, take up potash in large quantities which is the reason why they thrive so well in volcanic soils. The orange, lemon, fig, olive, and plum require lime in large proportions, a material that is abundant in many soils, but absent, or in small supply, in others. Phosphoric acid is required in large proportions by the almond, quince, and and lemon, and to a considerable, but lesser, extent by the plum, pear apple, cherry, orange, and strawberry.

— The Principal Special Manures. —

Bone-dust is one of the best known and most generally used special fertilisers. It contains a large proportion of phosphoric acid and other useful materials, such as ammonia and nitrogen. Bones are simply broken in pieces, more or less small, or reduced to the form of dust or meal. As a matter of course, the finer the material the quicker its action upon the roots of plants. Superphosphate of lime is formed by the action of sulphuric acid upon bones and various mineral phosphites. It is quicker in its action than bone-dust, and is one of our most useful fertilisers. Guano is a useful material, but its value depends upon the proportions of ammonia and phosphates, and the kinds vary considerably. Gypsum (sulphate of lime) is a material found in some parts of Australia, and may be turned to good account as a fertiliser on some soils, and makes a good dress-

ing for heavy clay, peaty, or alluvial soils. Potash is found largely in wood ashes, and is sold in concentrated forms as sulphate and nitrate (nitre of saltpetre). It is also largely used in the form of kainite, a material found in large natural deposits in Germany. Sulphate of ammonia is an excellent fertiliser, obtained from a bye-product in the manufacture of coal gas, containing from 20 to 25 per cent. of ammonia. Sulphate of iron is a useful material for soils that have not the requisite amount of soluble iron available, though this is not often the case. Soda may be applied in the form of nitrate of soda, and is a requirement of many fruits. Lime is necessary, more or less, for all fruits, but many soils contain sufficient natural supplies. It is very useful for soils of a heavy nature, and for land that is deficient in vegetable matter. Lime is useful in neutralising soils acids, and helps to make the alkalies, and soda soluble and the land more open and friable.

– Root Pruning. –

Fruit trees, wehen planted in rich soils, often make heavy annual growths of foliage and wood, but yield very poor crops. It is a common, but mistaken, practice to prune back these trees severely, the idea being that the remedy is to remove plenty of the wood. This, however, is precisely the thing that ought not to be done, as such treatment only increases the evil. The more the branches are cut away the greater effort will the trees make to restore the old state of affairs. The true remedy is to curtail the supply of nourishment by lessening the power of the roots. This object can be effected by root pruning or the removal of a portion of the roots. The usual method is to make a semi-circular trench on one side of the tree, at such a distance from the stem as will depend upon its size. Make the trench a spade wide, as deep as the roots extend, and remove with clean cuts all the roots within the radius. In the following year treat the other side of the tree in the same manner. This mode of treatment will generally bring the most refractory trees into fruit-bearing condition.—Exchange.

Vegetable Garden.

Asparagus.

Asparagus is a native of the coast districts of Europe and Asia. This fact accounts for the practice of applying salt to the beds. Expert opinions differ as to the best plan of growing asparagus, but this remark applies to all cultivation. A rich, deep, sandy, alluvial, well drained soil, with plenty of saline matter, is the ideal asparagus ground. Will our readers near the sea shore please note this, and revel in the king of vegetables. It is delicate, nutritious, and wholesome, and should be much more common than it is.

Preparation of the Ground.—Double dig or trench the ground to a depth of 2 ft. at least, or better still, 3ft., at the same time working in as much stable manure as can be spared, and a dressing of coarse bone dust. It the land is at all stiff, a quantity of short seaweed and sea sand with the mannre is an improvement.

Raising the Plants.— The plants are better raised in separate seed beds of light, rich, sandy soil. Sow the seed in the autumn (February, March, or April) or in spring (Agust and September). Sow in drills 1 foot apart and 1 inch deep. If sown in spring soak in tepid water for ten or twelve hours before sowing. When the seed is well up, thin out the plants if too crowded, as they will require to remain in the seed bed until the second year.

Making the Beds.—Narrow beds, say 3ft. wode, are in every way preferable, and 18 in. at least should be left between the beds. The beds should be kept as low as possible, because the yearly dressing will gradually raise them. A bed 3 ft. wide will take two rows of plants. The plants should be set 1 ft. apart in the rows.

Buying Plants.—As it takes two seasons to raise plants, and one or two years more before cuttings can be made, those who desire to establish an asparagus bed would act wisely in buying well-established plants from a nurseryman. These may be planted out in the prepared bed in June, July, or August. In planting make the hole large enough and highest in the centre. Set the plant in the centre. Set the plant in the hole and spread the roots out all round. Cover the plants, so that they will have 3 or 4 in. of rich soil above them. The bed should not be cut from the first season, and only moderately the second. After this, with judicious cutting and attention, the bed will yield well for many years.

Dressing and Cultivation. — Before the plants shoot in spring the winter dressing of manure should be lightly forked over. During the growing season the beds are benefited by several dressings of superphosphate, kainit, and soot, or sulphate of ammonia, but don't overdo this. It is well to remember that 1 lb. of fertiliser equals 7cwt. to the acre, which is a good dressing of any one concentrated manure. For a bed 16 ft. by 3 ft. each dressing might sonsist of 1 lb. each superphosphate and kainit and ½ lb. of sulphate of ammonia. After the stems have turned yellow and been cut down, the bed should be dressed with seaweed, manure, and superphosphate, and left for the winter. Of course, all weeds should be kept down, and on no account shound the seed be allowed to fall. The worst weed in an asparagus bed is young asparagus. For good results ample water is required in spring. Cutting should cease in summer, and the stems allowed to mature.

Vegetable Notes for July.

July is a "neither one thing nor another" month. It is, to a large extent, too late for winter planting, and it is too early for spring sowing. The following work is seasonable for the Adelaide plains. In districts like Port Augusta, spring work should be pushed ahead, and plants for summer crops should be got ready for August planting out, since work there can often be done a month earlier than here. In the hills and the South-East, on the other hand, winter stuff only can be grown.

— Sow Seeds. —

Provided soil and climate are suitable, sow late varieties of cabbage, cauliflower, cress, carrot, endive, lettuce, mustard, pickling or silver-skin onions, parsnip, parsley, radish, silver beet, red beet, spinach, turnips, and cress.

— Peas and Broad Beans. —

These may be sown in July for late crops, and this year should do very well.

— Onions. —

Onion plants should be set out at once on the plains if it has not already been done.

— Potatoes. —

Plant freely, according to the locality, so that the potatoes, as they come up, will escape the usual frosts. Out of season frosts can hardly be guarded against.

— The Globe Artichoke. —

The Globe Artichoke is the true artichoke. Seed may still be sown; but it is better if the plants are ready to put out now. They should be four feet apart each way. It is the flower head of this plant which is cooked and eaten, and they are considered a luxury, but not a vegetable to make a meal from.

— Jerusalem Artichoke. —

Jerusalem Artichoke is a tuberous rooted sunflower, and is a delicious, healthy, easily-grown, prolific, and much neglected vegetable. Tubers should be planted from now till the end of August, in well-prepared, rich soil, where they can be watered in summer.

— Asparagus. —

July and early August is the most suitable time on the plains to make new beds of asparagus.

— Old Asparagus Beds. —

If not already done, old asparagus beds should be dressed with either (1st) a heady dressing of stable manure, or fowl manure, together with a gaod sprinkling of salt; or (2nd) superphosphate and kainit (say up to ½lb. of each to the square yard). Instead of the kainit, a good sprinkling of wood ashes and salt may be used.

— Broad Beans. —

Early sown beds will be in flower, but the pods may not set. If this be the case, it is advisable to nip out the growing tops of the plants. This slight check often has the desired effect.

— Rhubarb. —

Make new beds in much the same way as directed for asparagus, but planting the crowns three feet apart. Manure the ground heavily. While rhubarb does not do as well on the plains as in the hills, it can be, and is, grown successfully.

— Sweet Potato. —

Those who are blessed with light, sandy soil, should not fail to try this vegetable, which is so highly appreciated and widely grown in America. Those having stiff clay soils may as well leave it alone. The seedsmen can supply the tubers, which should be put in soil in a manure heap, under a frame now, and in August or September the young plants can be taken off and set out in the garden.

— Cucumbers, Tomatoes, Melons, and Marrows. —

If a hotbed be available, or can be made, it will be desirable to raise some plants of the above summer crops.

— Carrots. —

This vegetable can be grown easily all through the summer on the Adelaide plains, and is a healthy, useful vegetable to have always available, especially where there are children. Light soil suits them best, but in any case it should be dug deeply and manured to the full depth of the digging. Plant in drills 12 to 18 inches apart, and thin out to from four to six inches in the rows.

— French Beans. —

In early localities a sowing of dwarf French or kidney beans may be made. Make a trench a foot wide and the same depth. Fill with manure and trample down. Put four inches of sandy loam on the top, and plant the beans in a double row. Let the rows run north and south. A six-inch flooring board on each side, and a strip of calico over the top in cold weather, will help the beans along.

— Silver Beet. —

No garden should be without a bed of this excellent and all-round useful plant. The young tender leaves make an excellent vegetable, hardly distinguishable from spinach, and the big leaves are as good a form of green food as can be grown for the fowls or the cow.

Potatoes and Potash.

Experiments at Rothamstead throw important light on effect of fertilisers and potato blight. The potatoes in a particular field were repeatedly and carefully sprayed with Bordeaux. The dates of the successive applications (says an exchange) were as follows:—June 27, July 7, August 3, and 18. Early in August it was noticed that the leaves of all the no-potash plants were beginning to blight, while the foliage in all the plots to which potash has been annually applied still appeared to be practically unaffected. The blight made rapid progress on each of the five no-potash plots, while the foliage of the vines upon all the other plots for the most part ripened normally. Practically all the leaves on the no-potash plots are dead by the end of August, at which date there was still considerable foliage on the other plots. There was no decay of the tubers, however, on any of the plots, but the marked inferiority in yield on the no-potash plots was, no doubt, in considerable measure due to the relatively early death of the foliage. George Ville, the celebrated French agricultural chemist, found in his experiments that the suppression of potash reduced the crop of potatoes from 9 tons 16 cwt. to 4 tons 4 cwt., and wrote on the subject: "Whenever soil does not receive potash, or where it gets no manure, the plants are poor and stunted, with withered and dry leaves, and that, too, in the month of June, when the other plants are still in a state of luxuriant growth. As for the tubers, they become wrinkled, withered, and reduced in size, their preservation being almost impossible. . . .The lack of potash in the soil is coincident with the potato disease, whence we may draw the conclusion that when plants are deprived of their chief mineral constituent, and consequently of one of the most essential elements of their existence, they become a prey to inferior organisms, such as microscopic fungi, etc."—"Queensland Agricultural Journal"

Growing Onions.

— Soil. —

There is mo crop which reuuires a ore judicious selection of soil if the est results are to be obtained. The oose, friable, voicanic soil of Ballarat, Varrnambool, and Mount Gambier re as suitable for onions as any in e world—they are, in fact, the ideal onditions. Where such soil is not vailable, the grower should try and ecure a rich, deep, friable, sandy oam, rich in humus or vegetable atter. The mechanical condition of e soil is most important this for crop, nd heavy clay soils will not be found be profitable, neither as a rule will ght sand, but it is better than clay. f suitable soil is not available our dvice is, leave the onion crop alone.

Another and most important conderation is freedom from weeds. The onion crop in its early stages is easily choked and difficult to hoe, and it is accordingly most unwise to plant the crop on land which has not been kept clean for several seasons. This is one strong argument in favor of the laborious transplanting system.

— Preparation of the Soil. —

A suitable preparation is to manure well and plant potatoes two years previously, and follow that with another manuring and mangolds or peas. In America carrots are considered to be a desirable crop to precede onions. Maize is also often grown the year previously. The important point is to grow hoed crops and keep them clean. It may be mentioned incidentally that cabbages do well after onions.

— Manuring. —

The onion requires plenty of available plant food. In this they are more greedy than either potatoes cabbages, tomatoes, or such crops, and the onion- grower cannot too well recognise the fact, for beginners often fail on this account.

The most important factor in onion culture is labor. It is an expensive crop the world over, and therefore the grower should give plenty of manure to ensure the best return for his labor for the cost of a 5 to 10 ton crop is nearly as much as a 15 to 20 ton crop.

As to the nature of manures to be used except, perhaps, in the rich volcanic soils, farmyard manure is indispensable for good crops especially should it be used freely on preceding crops. From 40 to 60 loads an acre will not be too much, and it should be as free as possible from weeds. Fowl manure is very good for onions.

In addition to this, artificials should be used. On an average 2,000 lb. of onions contain (according to the Connecticut Experimental Station records) 2.70 lb. of nitrogen, 0.92 lb. phosphoric acid, anh 2.09 lb. potash. A crop of 20 tons would therefore remove from the soil 60.48 lb. nitrogen 20.61 lb. phosphoric acid, and 46.82 lb. potash. This indicates that we should (says R. L. Watts, in his bulletin, "Onion Culture") supply the three plant foods in the above proportions, remembering that they must be greatly in excess, for the roots can only draw on the small portion with which they come in contact.

Usually it is highly probable that the soil requires all three fertilsers. From 6 ta 8 cwt. of kainit or 2 to 2 of muriate should be applied and it should be well worked into the soil in the autumn before the crop is to be planted.

For phosphroic acid, from 2 to 3 cwt. of superphosphate should be applied before planting. The nitrogen can be applied in the form of nitrate of soda or sulphate of ammonia, 1 cwt. per acre, can be applied with the crop, and 1 cwt. as a top-dressing later on. These manures will leave the ground in splendid condition for future crops after a heavy crop of onions has been harvested.

— Preparing the Soil. —

The land should be ploughed in the autumn and the potash applied, because potash manures seldom give good results if applied with the crop. In spring the land should be cross ploughed and worked down finely with disc harrows, spring-tooth cultivators, or the Planet Junior and harrows. Finally, it should be smoothed with a plank drag or brush harrows. No labor necessary to give a good tilth is wasted. So true is this that the expression has arisen, "As fine as an onion bed," to designate good cultivation.

— Seed. —

Good seed is absolutely necessary, and as onion seed to be good and reliable must be fresh, it is wise before buying to get samples and test the germinating power. Onion growers should always select and save the best bulbs and plant them for seed.

— Sowing the Seed. —

Stretch a line across the field as a guide for the drill, and then with a Planet Jr. handdrill, drill in the first row. Then have attached to the drill a guide by which the second and subsequent rows can be drilled with ease and regularity; 4 lb. of good seed will be enough for an acre of good onion ground, but to ensure a full stand it is best to add one or two pounds to that.

— Planting Out. —

This is back-aching work, and boys are best at it with a good man to look after them and keep them going. Have good planting lines and good dibbles. Cut the roots three-parts off and the top half off. Teach the boys to hold the plants in the left hand, and plant so that the roots are straight down and the bulb just below the surface. The soil must be well firmed round the roots by one pressure of the dibble.

The rows should be 1 foot apart and the onions 4in. in the rows. Four inches in diameter is a big onion, and we only need to have enough space for the onions to grow to meet one another, for the tons do not crowd the ground, as do those of some crops, thus, rendering wider planting necessary for air and light.

— Weeds. —

Success with onions depends to a very considerable extent on keeping the field free from weeds and the soil well worked. The Planet or other similar wheel hoe will do this admirably and in a large field a horse can be used. As a rule, however, most of the work will have to be done with hand wheel hoes.

"No one can hope to be successful in commercial onion-growing," says T. Greiner in Burpee's 'Onions for Profit,' without being well-equipped with those implements, or without using them, less as weed-destroyers, but rather as

preventives against weeds. The fight should begin before weeds can be seen."

This is necessary, and usually involves the greatest expense in producing the onion crop. The planting-out system gains in this much what it loses in the trouble of planting. Boys are good for weeding if they can be kept going under a good man. Girls are better still, and it is good healthy work for them, and not too hard. Boys, girls, or men must be taught to keep their feet well between the rows.

Hilling is not only not needed, but should be carefully avoided, as the onion bulb wants to grow on the surface of the soil. Go over with the wheel hoe and do all that can be done with that and the hand hoe, and then finish off by hand weeding, for to ensure success the crop must be kept clean and the soil must be kept loose and free.

— Gathering. —

It is not necessary to break the tops, as some believe. It is not the habit of the onion to run to seed the first year, and when it does it shows that the seed is not of a good strain. The onion plant is a biennial and stores as much nutriment as it can in the bulb the first season, and then dies down to rest until the next season, when it uses the material to produce a flower stalk and seed.

Onions mature unevenly, and it does not do to wait until all are dead, for they will ripen off after being pulled. They should be pulled, and if the sun be not too hot left in the windrows to cure, i.e., to dry off, which may take a week or more, according to the weather. They should not be left too long, and if rain threatens should be got under cover.

— Storage. —

If onions are to be stored, do not let them stand in sacks. If possible, gather them in boxes or baskets, and cart them to the store, and there empty them out on the floor, or on shelves, or in a loft. If well cured and dry they can be piled a foot deep, but to keep onions the tops and roots should be twisted off.

— Yield. —

A good crop of onions should yield 13 tons to the acre, and a very heavy crop up to 20 tons. Probably from 5 to 10 tons are nearer the general yield.

— Notes. —

Do not spare the stable, or cow or barnyard manure, and have it free from weeds and well rotted.

Do not throw old stems, useless onions, etc., about the land if it is to be cropped again the following year, for they may cause blight.

Poultry manure and nightsoil are good for onions.

The more well-rotted stable manure the better the onion crop.

How to Make an Asparagus Bed.

Reply to J :—As asparagus is a permanent crop it is worth taking reasonable trouble to thoroughly prepare the bed. The amount of preparation necessary will to a large extent depend upon the natural soil. Long narrow beds are preferable, so that the cutting can be done from each side, without disturbance of the roots. The beds should be kept low because the yearly dressing will tend to build it up. Four feet beds taking three rows are are a handy width, or two rows may be planted in a three foot bed. If the shape of the ground at one's disposal makes it desirable to have beds side by side, the whole area including the 18 inch dividing paths should be prepared. This will give extra feeding room for the roots. To prepare the bed take out the soil the depth of 18 inches, keeping the top spit apart, if the subsoil is very poor it is advisable to wheel it away, and replace it by better. The ground should be thoroughly turned over to the depth of quite three feet.

Some authorities advocate another foot but this is going to unnecessary trouble and expense. Having thoroughly broken up the bottom soil, removing any which is best away, any garden refuse scrapings from the wood heap, bones, old boots, etc., can be dug in. Any long manure available and a liberal dressing of bone dust, say 2lbs. to the square yard, should be worked in at the same time. Having prepared the bottom and trodden it fairly firm, old decayed manure and the best of the top soil, should be placed on the bed in alternate layers, and forked over. Continue this until the bed is somewhat higher than the surrounding ground. If left for a few weeks it will sink a good deal. During this time the surface should be turned over two or three times so that the soil will be mellow and warm when the roots are placed in it.

Land must not be ploughed in a too wet condition, otherwise it cakes still more.

The Breeding, Selection, and Care of the Dairy Cow.

From an article by M. B. Connor in the Victorian Journal of Agriculture.

(Continued from June Issue).

We may, therefore, from these and other similar facts, which could be further extended, be justified in concluding that, so far as regards the size, general appearance, external form, and muscular development, the influence of the male is superior and stronger to that of the female. Yet it must be clearly understood, that I do not wish it to be inferred by the stress I have laid upon the importance of the selection of the bull, that the qualities of the female are a matter of indifference. So far from this being the case, I would censure in the strongest terms, any neglect displayed in the selection of the qualifications necessary in the cow to be used for breeding purposes. It is of the utmost importance to study the breeding and milking qualifications of the cow as those of the bull, though the respective excellencies may not be the same. Hereditary disease, and weakness of constitution are much more likely to be transmitted to the offspring by the cow than the bull, which is in keeping with the long and intimate connection maintained between the cow and her calf, both before and after birth, till weaning takes place. As the same blood nourishes both, each is likely to become affected by any unhealthy change in this fluid. Soundness of constitution is, therefore, an indispensable requisite in the cow. The fact, however, of the male animal begetting fifty to sixty offspring in the course of a year, whilst the female seldom produces more than one, must, and always will, cause improvements in breeds of animals to be principally effected by means of the male used in the herds.

— Selection of Animals For Breeding. —

The animals selected for breeding must be adapted for some well defined purpose in the system of management, and to the conditions in which they are to be placed. The principal causes of animal variation are climate, food, and habit. Where practicable, it is always wise to procure stock from similar country, as it is necessary to start with stock suitable to one's district. All improvements in both animals and plants are due to the natural laws of variation. The slightest differences of form or organization are more or less hereditary and transmitted by the parent to the progeny. Desirable variations are selected, perpetuated, and, as they appear, accumulated. High cultivation is therefore necessary to maintain improved form. As there are no infallible external signs indicating milk-giving capacity, exceptions will always be met with.

Much attention, when selecting a dairy cow, is directed to the growth of the wedge-shaped body, the improvement of the hind quarters, and the development of the udder, with all its graceful outlines and symmetrical proportions.

The full viw of a typical dairy cow shows a lean, roomy frame; a distinctly wedge-shaped body, with moderately long neck; good sloping shoulders; fine wither; broad and deep chest; light fore quarters, gradually enlarging in depth and width towards the hind quarters; well sprung ribs; straight back; deep at flanks; long and broad hind quarters; thighs deep and broad; fine bone; large docile eyes; capacious, well shaped udder—broad, well up to the body and running firmly along the belly, the teats squarely set on and hanging perpendicularly.

Cows of this type and quality cannot be picked up every day, and must be bred on the lines already indicated.

The dairymen of the Jersey and Guernsey Islands set a good example to the rest of the world in the way they guard the purity of blood in their cattle. As far back as 1789, a law was passed in Jersey, making it unlawful to import any living cattle into the island. Heavy fines were imposed on the importer, the vessel, and even the sailors who aided in such importation. It is just this jealous regard for the purity of blood in their cattle that has sent all the world to these islands for them. Contrast this wise policy with that of the Victorian dairy farmer who is not content until he can pack all known breeds into the skin of one animal, with the result that he has neither special purpose, nor dual purpose, but a no purpose cow. It simply shows what a lot we have to learn in regard to successful breeding.

— Feeding. —

Hand in hand with the selection and breeding of dairy cows is the question of proper feeding. Dairy cows, no matter how good they may be at the pail, if they are not fed to stimulate their productive capacity, will not produce profitable returns. The old rule of thumb practice of the average farmer in confining the cows strictly to the products of the pastures for their sustenance will have to become a thing of the past if dairying is to be carried on successfully. Hand feeding must be resorted to and preparation made to conserve abundance of succulent nutritious food for the dairy herd during the dry months

by the aid of the silo. This is imperative, for with the natural pastures as the only supply of food, milking cows suffer in constitution during bad seasons. If this trying condition is continued and practised, emaciation of the body is a natural consequence. Heavy milkers under these trying conditions become seriously injured, as more digestive food will be converted into the milk at the cost of their vitality. The constitution becomes weakened, and functional derangement and disease of the organs follow, brought about by sheer starvation. The progeny is also endangered if the cow is in calf, as it is deprived of the nutriment and support which should be obtained from a well nourished mother to lay the foundation of a good constitution and a profitable milker.

Dairy farmers are often led astray regarding the result of feeding and the effect it has on the return of milk produced. A cow when freshly calved, if in low condition, will generally respond to a system of judicious feeding and care, and the quantity of her milk will increase in volume, especially if the feed she has been accustomed to is devoid of the necessary proteid constituents and moisture; this increase will, however, only continue until such time as she builds up her system and becomes properly nourished. After the cow becomes well nourished and reaches her highest attainments, there appears to be no method of feeding that will raise the standard of her milk to a still higher degree. Any food taken into the system up to this point and not utilised for the production of milk, will be used for forming fresh flesh or be excreted.

The weighing of each cow's milk and the use of the Babcock tester will enable the dairyman to discriminate between good and bad cows, those not paying their way and those being milked at a profit. There are two kinds of cows kept in most herds, those that eat more than they make, and those that make more than they eat. "Feed for quantity and breed for quality" is a golden rule where the dairy cow is concerned. Cows cannot change the relative proportions of their milk to suit our convenience; all we can do with feed is to assist the cow to produce a large quantity of milk of her own individual proportions.

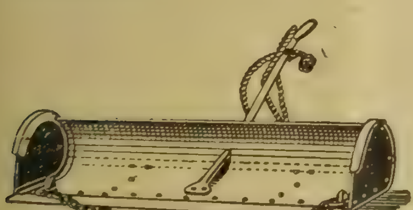
The principle of balancing the elements of food so that the cow may be best assisted to make milk and in profitable quantities, the study of environment, how to promote her health and comfort, and the treatment meted out to her, all have an important bearing on the return in milk she will produce from the feed given her. The cow to keep in the herd is one that has the ability to turn all the food she may eat and digest, over and above that required for her maintenance, toward the udder, there to be transformed into milk. The capacity of a cow for producing milk depends largely upon her capability for digesting food and assimilating it into her tissues. Dairymen who profit most by the keeping of cows soon learn to familiarize themselves with these important characteristics, and understand their relationship to capacity for production. Feeding the dairy cow for profit involves a minute study of each animal in the herd; it requires the knowledge of the amount of milk and fat each cow is capable of producing.

Dairy farming is becoming intensive rather than extensive. It is not uncommon now to hear of persons raising profitable crops from apparently poor land, while other people receive no return at all from land of similar texture. The value of the manure made from good feeding is more and appreciated by the farmer as he uses it to renovate his depleted soil, robbed of both its humus and its nitrogen by continual cropping. This loss can be avoided by raising more fodder, keeping more stock, and thereby making more manure. Care must, however, be taken to provide a sufficiently rapid rotation of crops to insure good soil texture, and at the same time, abundance of fodder to be mixed with silage, a plentiful supply of which should always be available.

As the silo preserves the green succulent fodder throughout the year better results are obtained than when crops are converted into hay. One important reason in favour of silage is that its preparation is founded on the fact that all green fodders contain about 75 per cent. of water, and 10 per cent. of fibre. When they are dried, the water has shrunk to 20 per cent. and the fibre has increased to over 40 per cent. Much of the nutriment in the succulent state, therefore, becomes woody fibre in the dry prepared fodder. The blood and lean meat in the animal are mostly derived from the protein in the food eaten, and not from the carbo-hydrates, or fat, which only produce heat, energy, and fat. It is literally true that the protein does make all these substances but at too great an expense to be practically carried out. One fourth of the solids in milk is protein and it

therefore follows that the more milk a cow gives, the more protein she requires. For the silo grow plenty of maize and leguminous crops. The maize should be allowed to thoroughly mature and not cut until the grain has reached the dent stage of growth. Lucerne is still better, as 11lbs. of it are equivalent to 8lbs. of bran. It would pay farmers handsomely to go in for more lucerne cultivation. Peas and oats, mixed and sowed at the rate of two to three bushels to the acre, and cut when the oat heads are well formed and the peas are in blood, make a splendid feed high in protein, and one greatly relished by the cow.

(to be continued).



Scientific Study of Soils.

(By "Agricola.")

To most people the soil is a most uninteresting and commonplace th ng. We are so accustomed to regard it as dirt or something unclean, that it is most difficult to realise that the soil is a most charming chemical laboratory where numerous complex chemical changes are constantly taking place. We can scarcely imagine the soil as teeming with life, microscopic though it be—in fact, more thickly populated than the surface of the earth.

For generations and generations the soil and everything connected with it have been shunned. Only during recent years have farming and gardening been considered desirable callings to pursue. The immense strides which have been made in agricultural science have done a great deal to raise the rural industries to a high level. The spirit of investigation has been aroused, and every intelligent farmer is studying his soils and crops and endeavouring to understand more and more about the farm which he owns.

— Soil Analysis. —

Nothing seems simpler than to make a chemical analysis of a soil and find out what is missing in a particular soil that makes it inferior to a soil in another part of the State. It is not such a simple matter as it looks. The soil is not only a vast reservoir of plant food which can be drawn upon by the roots of plants just as needed, but it is also a great factory where raw material in the shape of manure is formed into the finished article—the crop. A complete knowledge of the soil and the part it plays in the feeding of the plants is only obtained by an investigation into the chemical, physical, and biological aspects of the question.

— Not a Storehouse Only. —

We must not regard the soil as a mere storehouse of plant food. water is indispensible to all plants. It is, therefore, of paramount importance to study the movement of water through the soil. The texture of the soil and the proportions of water and air which it retains, affect its temperature. Some soils are much warmer than others under the same conditions; hence some soils are early, others are late.

— Not a Dead, Inert Mass. —

The soil is not a dead, inert mass. It is a scene of the greatest activity, both chemically and biologically. Were we able to watch the countless operations going on in the first foot of soil we would be filled with wonder and amazement. Probably with all our great inventions working on these subjects we shall some day have presented to us in cinematograph style a busy scene as enacted in our surface soil. Some of the organisms in the soil work upon the dead vegetable matter and completely transform it into valuable plant food. Other organisms work in an opposite direction and destroy the plant foods. Certain other organisms live upon the roots of plants to the mutual benefit of both.

— Differences. —

One cannot help noticing in a ong train journey the gradual change in the flora (plant life) as he passes from one part of the State to another. The change is a very decided one on passing from Adelaide through the Mount Lofty Ranges, to Callington, and thence to Murray Bridge, through the desert past Narracoorte to Mount Gambier.

It cannot help being noticed that certain plants do better in some regions than others. Some plants grow well near the seashores, some thrive on wet clay soils, whilst others grow to perfection in our very sandy soils.

Certain weeds grow well in clay lands, others again tolerate the sandy stretches of country.

Plants are much influenced by environment, and at times slow to adapt themselves to new conditions.

This is noticeable with introduced plants. A wheat that does well in Russia or Manitoba may, during its first season, be almost a failure in our State. It may take several years before the new plant accommodates itself to new conditions of life.

From what has been stated it must be felt that a thorough knowledge of the soil and its origin is of great importance to the farmer.

— The Soil and Its Origin. —

If we take samples of soils from various sources we cannot help noticing that the soil is composed

of mingled fragments of different material, chiefly small particles of rock of varying sizes, from small pebbles to grains only discernible by the magnifying glass. From such examination we are led to believe that all soils have been formed from rocks.

All soils are derived from the original or igneous rocks of the earth. Granites, diorites, and gabbros are good examples of the primary rocks of our globe. Geology teaches us that our globe was once a molten mass, which upon cooling solified into rocks. These rocks must have contained all the mineral matter of plant food. We cannot conceive of any other source. All such plant food must have been in a most insoluble state which had to be changed by various agencies into a soluble.

We can study these changes best by reference to the lava beds of recent origin. In an incredibly short time this molten material solidifies, and the resulting rock is soon transformed into more or less fertile soil.

— Pulverisation. —

The first step in the formation of soil from rock must be the breaking up of the rock into smaller particles. Quite a number of natural agencies take part in this process. Heat and cold, the action of air, water, ice, and wind all have their work to perform in this respect. Consider a granite rock. We are all familiar with the granites at Victor Harbor, the Bluff, and Port Elliot. Those who have visited Port Lincoln must have been struck with the great development of granite rocks in that district.

It is an easy matter to distinguished by the naked eye three distinct minerals which comprise these granite rocks. The black-looking shining material which peels off in small flakes is mica; the pink mineral is a felspar; and the somewhat bluish mineral is quartz. A typical granite contains mica, felspar, and quartz.

These three minerals are differently affected by changes of temperatures. When heated they expand at different rates, and when cooling their rates of contraction are different. When such rock is subject to extremes of temperatures, the result must be to shatter the rock, not of course in a single night. The natural forces are continually operating. In our northern districts and particularly in Central Australia, the difference in temperature between day and night is very marked indeed. The hottest part of the day experiences a temperature of about 160 deg., which gradually sinks to zero at night. The water will almost boil in the day, and at night become frozen. Rocks in these regions are constantly being strained by the unequal expansion and contraction of the component minerals. Even if the rock is composed of only one mineral these changes of temperature gradually tend to disintegrate it (break it up). It can easily be imagined how soon granite rocks begin to crumble away in these dry regions. The rocks are eventually reduced to dust. Then the wind does its part in conveying this dust to other places, piling the material up into vast sandhills or dunes. The great sandy ridges of Central Australia, the dunes of Sahara, and Central Asia are formed in this way.

There are immense deposits of loess in China. This vast accumulation is supposed by geologists to be nothing else than the fine dust carried by the wind from the great desert of Central Asia.

Those who have lived in Broken Hill can readily imagine what the wind can do in piling up dust. During our dry summer large quantities of dust are carried away by wind. We can watch the progress of the sandhills on the coast at our watering places. We see fences almost covered by sand, and houses being overwhelmed in the same manner.

Vegetation plays an important part in preventing the surface soil from being blown away. Our greatest dust storms occur on wide, treeless plains. It hot climates the most important agent engaged in breaking down rocks to dust is change in temperature.

— Action of Frost. —

In cold countries the great weathering agent is frost—intense cold. Physics teach us that water whilst changing into ice, expands with almost irresistible force. If a bottle be filled with water, corked tightly, and exposed on a very cold night, when the temperature falls below zero, it will be found to be cracked when examined next morning. On the Continent of Europe and North America it is no uncommon occurrence for water pipes to burst during cold weather.

Almost all rocks, and especially sandy ones, are somewhat porous. They therefore absorb water. During exceedingly cold weather this water freezes, expands, and forces ticles of rock are bound firmly tothe particles of rock apart. Whilst the water remains as ice the pargether. When the ice melts the rock particles easily separate. Consider a lump of hard soil. Rain falls. The clod becomes saturated with water, which freezes, expands, and forces the particles of soil apart. The clod remains as hard as a stone until the thawing sets in, when it falls to the finest powder, in a finer state of subdivision than can be obtained by any crushing machine in existence. Frost in these countries is a great tillage implement, and is a farmer's friend. When frost damages our crops we are apt to regard it as a curse rather than a blessing. It may do harm at times, but it also does incalculable good.

Have you ever ascended the side of a hill in a cold climate and noticed the number of loose stones that make walking a great effort? These stones are the result of the work of frost. They have been broken from the rock composing the mountain, and are gradually working their way down the side of the hill. In Scotland such ac-

cumulations of loose stones are termed "screes."

In humid countries the face of polished granite rapidly deteriorates. Cleopatra's Needle retained its polished face for centuries on the banks of the Nile, but on removal to London it was soon found necessary to apply a waterproof varnish to protect the surface. In Canada and the United States, and many other countries the same precautions have to be taken to protect polished slabs. When flag stones have to be quarried it is customary for the workmen to saturate the surface of the rock with water before winter sets in, for the rock is found to split more readily along the bedding places under the action of frost than by any other means.

Using Commercial Fertilizers.

Artificial manures are used for the express purpose of obtaining an increased yield, and thereby a greater profit. Whether the fertiliser used will give a bigger profit, or any profit at all, depends chiefly upon the soil and the particular crop. If the manure happens to suit soil, climate and conditions, an increased yield must result. At present it is a case of "follow my leader." Everybody uses phosphate because the next "fellow" obtains a good yield by so doing. Farmers as a rule know very little about their soils and the requirements of their crops. South Australian farmers are no worse than others in this respect, probably they have a better knowledge than their friends in other parts of the Commonwealth. At all events, South Australian farmers are welcomed all over Australia. We use manures more profitably than farmers in the eastern States. In some parts of New South Wales farmers are afraid to use superphosphate; not until their neighbour has grown several good crops can they be induced to do likewise. It is certainly a good plan for farmers to conduct experiments on a small scale on their own farms. By so doing they learn much in regard to the climatic conditions prevailing on their own farm. There are several different systems in vogue in many parts of the world. I will now describe a few.

— The Ville System. —

The Ville system is so named after the celebrated French chemist. No system is absolutely the best each has its own particular merits. Ville's method assumes that plants may, as far as manures are concerned, be divided into three groups. One group is specially benefited by the application of phosphates, a second by potash manures, and the third require nitrogen in abundance. Ville's plan suggests that the dominant fertiliser should be applied in excess to the particular group. By this system wheat, rye, oats, barley, require nitrogen in excess; phosphoric acid is dominant for turnips, maize, sorghum, sugar cane; while peas, beans, clover, and potatoes require potash manures. This system does not bar the use of other manures to the group of plants mentioned. It implies that while phosphatic and potash manures may be needed by wheat, oats, and barley, nitrogen must be the plant food applied in excess. When the soil is fairly well supplied with plant food and the field is well tilled, this system of manuring should give good results.

— Wagner's System. —

Wagner's system was propounded by the German scientist of the same name. According to Wagner as phosphatic and potash compounds and most mineral constituents of soil are not likely to be leached out, whereas nitrogenous compounds are so soluble that they are easily lost in the drainage water, it follows that nitrogenous fertilisers must be carefully used. The mineral elements are cheap, the nitrogen compounds dear. The economical use of nitrogen will mainly depend upon the abundance of phosphoric acid and potash present. When phosphoric and potash manures are applied in excess, then the nitrogen must be applied when the plants are best able to make use of it, that is, during the growing period. It is also better to use small amounts of nitrogenous manures at such times and quantities as the conditions demand.

— The Analysis System. —

As the name implies the analysis system is based on the analysis of plants, which tell us the food requirements. We can, from an analysis, calculate the amount of plant food per acre removed by certain crops. Different formulas must therefore be recommended for each crop, and the phosphoric acid, potash, and nitrogen are used in the proportions in which they exist in the plants. This system, although it may result in large yields, is an expensive one. A soil may be rich in phosphoric and potash, and may not need the addition of either of these plant foods to secure good results.

— No System. —

The no system is sometimes termed the "hit or miss system." A manure may be used without any knowledge of the conditions of soil, and the crop requirements. If a good yield results all is well, but a poor yield at once shakes the farmer's belief in fertilisers. As before mentioned almost every farmer in this States uses a phosphatic manure. Now we know that all soils are not alike either in chemical composition or physical conditions. A sandy soil requires different treatment from that to be given to a stiff clay. Yet the farmers apply super to both, and oftentimes with good results. A farmer leaving the north for the southern districts expects his farm practices in the former to suit the conditions prevailing in the latter district. Such

a change is not so violent as one, say, from England to Australia. The Englishman has looked upon fallowing as a wasteful practice, he has also been taught to use nitrates in excess on his wheat crop. Let him try such system of manuring in South Australia and in every instance he will come out on the wrong side of the ledger. Anyone who uses manures in a haphazard manner will come to grief. For a system to be successful the principles governing such system must be sound.

Different soils contain varying amounts of plant foods. A certain soil may be lacking phosphates, but may contain sufficient potash and nitrogen to produce a maximum yield. In such cases phosphatic manures are only needed; it would be wasting money to apply the others. It seldom happens that all three plant foods are lacking at one time.

— Field Experiments are Always Best. —

A chemical analysis of a soil may indicate that all the plant foods needed by a crop are present, and in more than sufficient amounts to produce big yields for many years. Still, the conditions may be such that only poor yields are obtained. In such case the only sensible way of finding out the proper fertilising ingredient required is to put the question to the soil. A few simple experiments could be conducted on the farm. A certain number of plots could be set aside, and different fertilisers used on each separate plot. Phosphates in one, potash manures in another, and nitrogenous compound in a third. Then a combination of the three elements used on one plot. A check plot on which no manure is used is also necessary. To be worth anything such experiments should be carried out for a number of years on the same plots. The experimental plots should receive exactly the same treatment as the rest of the field. Generally the eye will detect any difference to growth, nevertheless it is necessary that each plot should be separately harvested, and the results tabulated, and just here let it be stated that this operation must be carefully conducted. The weight of grain and straw from each plot should be carefully calculated. The result of one year's experiment must not be considered conclusive, but the average for several years will give much valuable data to work upon.

— The Plot System. —

No matter how many tests are carried out by the "plot" system, there is no method so truthful as those conducted on field plots. The plot system is no doubt of great scientific interest. With such experiments the conductor has almost complete control of every factor. Not so the farmer. He has little control over the field. True, he can plough and sow, and reap, but further than that he is powerless. There are so many conditions to be considered on a large scale that do not present themselves in the plot system. The experimenter has complete control of drainage, physical conditions of the soil, immunity from insect or fungus pests, and the amount of plant food present in the soil. The farmer has little, if any, control of these factors when experimenting on a big farm.

— Not a Panacea for All Evils. —

Farmers should not consider the use of artificial manures a panacea for all the "ills a plant is heir to." No matter how much manure is applied, the results will be poor unless the farmer works his soil intelligently, sows the most suitable wheat for his district, and attacks fungus pests attacking his plants. The constant use of artificial manures necessitates most careful farming. It means that a proper amount of humus must be kept in the soil to get good results. Where stable manure is impossible, a green crop must be ploughed in the soil. As artificial manures actually supply plant foods, it follows that when such manures have been sensibly employed, a soil must become richer year by year.

We in South Australia wish to obtain maximum yields by the use of super. A time must come when our soils will be depleted of potash, we will then find it absolutely necessary to apply both potash and phosphatic manures. We use such small amounts of phosphoric acid that one is inclined to doubt whether the increased yields are due to the use of this plant food. We are certain that the farmers to-day are getting much better yields, not because they are using phosphates, but because of the more intelligent methods of farming now adopted. More attention is being paid to all forms of tillage operations, wheats are more carefully selected, and farm implements are greatly improving. All these factors tend to increased yields. We have still much to learn about farming. The Government cannot be accused of spending too much money on experimental farming.

What an Animal Requires.

Crudely speaking (says the Mark Lane Express), an animal requires for growth nitrogenous material for flesh formation, oil and fat for energy, and minerals, phosphate of lime, etc., for its bone structure, while the plant requires for its rapid development nitrogen, phosphate of potash, etc., and other substances correlative to its nature. Fortunately for us, plants are able to derive a large part of their sustenance from the air and water, and substances which are almost always present in the soil in ample quantities, but there are some ingredients which are continually carried off the land by the present system of cultivation, and as they are not contained in sufficiency in the natural soil, have to be replaced by us. These essential ingredients are nitrogen or ammonia, phosphate of lime, and potash. For instance, a wheat crop of 30 bushels extracts:—Nitrogen, 48lbs. per acre; 21lbs. phosphate of lime per acre; 28lbs. potash per acre. Barley crop of 40 bushels extracts: 48lbs. nitrogen per acre; 21lbs. phosphate of lime per acre; 35lbs. potash per acre; and it stands to reason that we cannot continue to remove these constituents from the soil without impoverishing it, and it follows as a consequence that in order to maintain the crop-bearing capacity of our land we must find some means of restoring these principal elements of fertility.

Climatic Conditions.

The commonest topic of conversation wherever Australian farmers foregather is the state of the weather, what it has been, what it is, and what may be expected in the near future. It is natural that it should be so. It is often said that "climate beats culture," but he who relies on climate trusts to luck, while he who places his dependence on culture invariably comes out better in the end. The business of the husbandman is as much influenced by climate as that of the agriculturist, and a close study of the climatic conditions of the locality in which he lives is of the greatest importance. A very curious illustration of this was given by Professor Sanson. A farmer on one side of the River Rhone established a dairy herd of Dutch cattle. The cows throve well, and yielded a large quantity of milk. Induced by the success of this dairy, a farmer on the opposite side of the river endeavoured to establish a similar dairy herd, but without success. His cattle did not thrive and they yielded very little milk. The cause of this non-success was a puzzle. The conditions of life in the two places were apparently identical; they were at the same altitude, and the cattle received equal care. Professor Sanson, however, soon discovered the cause of the failure. In the second dairy the cattle were exposed to the prevailing wind, which was of a very drying nature, from which the first farm was protected. This difference, which was scarcely noticed by the residents, accounted for the success on one farm and for the failure on the other.

Planting.

In planting trees in large quantities the land should be ploughed and marked out in rows four feet apart each way, and the young trees planted at the intersections of the furrows. All deciduous trees, that is, trees that drop their leaves, should be planted as early as the weather will allow. The roots should be well spread and planted firmly, the same as older trees. If a cultivator could run both ways between the rows four or fives times, each season until the end of the second season, it would be of great benefit to the trees. After this the trees would begin to cover the ground and further cultivation would be unnecessary. If the land is such that it cannot be ploughed, the trees may be planted in the ground the same distance apart, merely making a hole to plant the tree in by turning over the sod with a spade. All trees for fosest planting should be small, say from one to three years old. The roots of all trees, whether old or young, should never for a moment be allowed to become dry; and, if the weather is very dry, it is well to puddle them, that is, taking a pail of water and stirring in a few shovels of earth, making it about the thickness of gruel, and dipping the roots of the young tree into it before planting; this keeps the roots from drying up.

Neither horses, cattle, nor sheep appear to place very much faith in sense of sight, but they make keen use of the faculties of smell and hearing. A mare separated for a short time from her own foal must have a sniff at it to begin with if the young thing is in a group of like age. A cow will act in the same way with her calf, and so will a ewe with her lamb. From the merely human point of view, a newly-clipped ewe looks a little odd when searching for a lamb with a patch of black on its shoulder or with a dark "collar" on its neck. The ewe disregards all markings and outward peculiarities; she simply "noses" her way until she finds her own.

Then and Now.

Farm life was downright hard work in the early days; single furrow swing ploughs represented the most advanced method of cultivating the soil. As often as not half an acre or so of wheat would be put in by means of a spade (and what a crop it would be!) Farmers had to haul their wheat along unmade roads, primitive bush tracks, to the city, or port, in waggons and drays of ponderous construction. They would return home with six months' stock of stores, a cask of salt, and a few urgent needs, such a horseshoe iron, nails, etc. In those blessed days the farmers lived as best they could; they had poor houses, with roofs of bark, that leaked like sieves after each shower of rain, floors of earth, and a minimum allowance of cooking utensils—frying pan, billycan, and camp oven. They seldom had any sheds for the few stock that they were able to tend. Everything was done in the hardest way. Man and beast suffered alike, and everything about the farm was disagreeable. The poor stock had to suffer in silence, but mankind could find a measure of relief in language, and one may rest assured, from what their descendants have absorbed, and even now so readily give expression to, that in this respect they could do full justice to any and every occasion. Sons can call to mind the oaths registered by them at the time that they would never cultivate the soil. Scores of them on arriving at the age of twenty-one shook off the dust of the desolate and dreary farms of their parents and cleared out for the city. This was only sixty years ago, but how great the change since then. Now, instead of getting away from the country, nearly everybody wants to get on to a farm. There one can now have many of the conveniences and comforts of life, added to the health-giving atmosphere and rural joys peculiar to farm life. Could some of the battlers of the forties revisit the old scenes, they would find that the accommodation of all, including the dog, is immensely in advance of what it was in their early days. The uncovered stringy-bark yards have given place to fine buildings, and instead of stunted, mangy stock nibbling straw, they would find high class stock of all kinds, living in comfort, sheltered from the sun, and even provided with water within easy reach. They would find the modern farmer's family no longer growling over a diet of salt mutton and salter pig, served up on tinware, nor sitting on bare benches before bare but very greasy boards, but comfortably established at a table stocked with fresh meats, fruits, vegetables of all kinds, cream, butter, and many other luxuries which were strangers to the pioneer period. One cannot blame any ambitious farm boy for being disgusted in those days; he had a right to be. Everything was drudgery and hard knocks. There was no pleasure in the present, and no hope in the future. The average farm in those days was unimproved in every way—rickety buildings, patchwork fencing, inconvenient slip-rails, and general confusion. No wonder the boys wanted to get away.

In these days good roads, substantial farm buildings, neat fencing, decent kitchens, and cosy dwelling rooms are the rule instead of the exception. Railways have shortened distances, and bicycles have brought the local township nearer, good prices are procurable for everything produced, and altogether the lot of the prosperous farmer is one of the brightest imaginable, and if the veteran of the forties could come back he would indeed be delighted. He would find the once disconsolate farm boy sitting in a well-carpeted parlour listening to the strains of his daughter's pianola, or absorbing the latest music hall ditties by means of an Edison record gramaphone. He would find the whole family well dressed, well informed, cheerful, healthy, and contented. The boys of to-day are not watching for any and every chance to get away from the blanky place. If they express a wish to get away at all it is to put a year or two at Roseworthy College, or to spend a few weeks at the seaside. The farm boy of now is not as the farm boy of then, a dunderhead and ignoramus, dull, stupid, and unambitious. He is a different creature; one who learns about soils and crops, the selection and care of stock, and other things which the old-time farmers never dreamed of. Man farms now, not by the sweat of his brow, the muscles of his arms, and the sinews of his back, but by the aid of machinery. Machinery, usually driven by the wind, pumps water to supply stockyards, sheds, and house. Machinery, as represented by horse-drawn drills, put in the crops, and Machinery of varied forms and vast utility takes off the crop and prepares it for market. All cultivation is done by machinery, and even the labour of the dairy has been mechanically made easy. Everything and everybody live better, and are more comfortable

used than was the case in the rd old days of then.

Of course farming is not without hardships even now. Low ices and dry times can still cre- e misery, even in the best-order- establishments. But there is longer the same ceaseless udgery, nor the same privation d forbidding conditions that aracterised the early history of e country. Summing it all up, e can readily say that the inside " farmer of to-day is one the most prosperous and inde- ndent men in the world. If he ns a well-improved farm, and is t of debt (as ninety-nine per nt. should be by this time), he ed desire to exchange places th no man. He need not envy e city dweller because the latter so well catered for in the mat- r af amusements. These also e within reach during the course a periodical trip to town, and the pleasanter for being treat- homeopathically. The advance s been great, but it has not as t reached all. There are many or farms and many poor farm- s, and always will be. But when e compares the farms of then th the farms of now all over the untry, it is easy enough to see d appreciate the immense strides at have been made towards pro- ess during the sixty odd years mediately behind.—Elder's Re- ew.

Plants have an organic existence ich requires to be fed with suit- le supplies of nourishment, just much as we or our animals, d as we all directly or indirect- come from the soil, so the sub- ances required for both partake the same nature, although in ferent forms. The bountiful rth is the mother of us all, or, Professor Huxley put it, " the de of grass and the horse con- in the same elements differently mbined and arranged."

Prevention of Disease.

(Continued from June Issue).

— Disinfection. —

Disinfection is the act or process by which infectious matter is removed or destroyed, and disinfectants are the agents used by which such removal or destruction is accomplished.

Fire is the most effective of all disinfectants, and it is taken advantage of in controlling the spread of communicable disease by the burning of carcasses and discharges of affected animals, and of sheds, bedding, manure, litter, soil and like substances with which such animals may have been in contact, or may in any way have infected or contaminated. Fire and heat are also used for sterilising utensils and instruments, and for purifying water and milk by boiling. Disinfection by boiling, or by exposure to superheated steam or hot dry air is also commonly practised.

Next after fire in effectiveness come various chemical agents, the most powerful of which are corrosive sublimate (perchloride of mercury); sulphuric acid and other mineral acids; caustic potash, quicklime, and other strong alkalies; carbolic acid, lysol, creolin, and allied coal-tar products such as phenyle, Jeye's Fluid, and Macdougall's dip; permanganate of potash (Condy's fluid); formic aldehyde (formalin); chloride of zinc (Burnett's fluid); sulphur vapour, and chlorine gas. Most of these act by coagulating or chemically combining with the albumen of which the infective germs are constituted, and so destroying them; and, if they come in contact with the infective matter, they are as effective as fire. Some of them are powerful caustics, and need to be used with very great care, and diluted to various strengths. Corrosive sublimate is usually diluted to 1 in 1,000 of water (acidulated), carbolic acid 1 in 20, formalin 1 in 40, permanganate 1 in 100, and they are safe and effective in these strengths. The first-named ought not to be used in disinfecting iron, tin, zinc, or leaden utensils, instruments, or materials, as it chemically corrodes these metals. Caustic potash and the milder carbonates of potash and of soda have a solvent action on greasy matters, and are hence useful disinfectants in creameries, butter factories, and slaughter houses. Another property which dictates their general usage at such like premises is their freehom from smell. Carbolic acid, chloride of lime, formalin, and other substances having a powerful and penetrating odour should not be used where food materials, and especially milk and its products, are being manufactured, prepared or stored. Quicklime, in the form of lime-wash and as a powder, has been largely used, and is in great favour as a disinfectant of sheds, floors, ground surfaces, cesspits, and the like; but its capacity as a destroyer of disease-producing germs is doubtless largely problematical, and when used as a lime-wash it is always a safe precaution to strengthen it with an effective proportion of carbolic acid, permanganate of potash, or other reliable disinfectant.

Experiments recently carried out by Mr. J. A. Gilruth, M.R.C.V.S., the chief of the New Zealand Government veterinary staff, would appear to indicate that lime is useless as a reliable disinfectant for bones, soils, and paddock surfaces in such diseases as anthrax. He mixed crushed bones known to contain spores with an equal quantity by weight of quicklime by grinding them together in a mortar. Sterilized water was added to slake the lime, and the mixture set aside in sterilized bottles for a week. At the end of that time the lime was washed away from the particles of bone which were then placed in culture media. Just as luxurious a growth of organisms resulted as did from control cultures which had not been treated with lime. Gilruth claims that although in this experiment the germs were within the substance of the bones treated, the test was a fair one, in that the lime was as likely to get to a germ in a small ⅛-inch cube of bone as to germs in larger bones, or in hard, clayey nodules of soils, and he points out that, while, at a pinch, equal parts of lime might be added to bones to be disinfected, it would be impracticable to treat the soil with equal parts of quicklime.

So far as concerns the disinfection of bones containing anthrax or other disease germs (and bones imported from India and elsewhere have been responsible for a number of outbreaks of anthrax in Australia and New Zealand during recent years), there are only two effective methods which can be

practically applied without commercial loss. One is treatment with sulphuric acid, whereby the bones are chemically converted into soluble superphosphate of lime, the germs being destroyed in the process; and the other is exposure for a few hours to superheated steam, under pressure, whereby the heated steam is forced into the substance of the bone particles, and so contacts with and destroys the contained germs.

Of physical agencies which act as disinfectants, heat, cold, dryness or desiccation, and sunlight or insolation are the most important. Heat has already been adverted to. Cold is less effective than heat, but the activities of germs are in large measure destroyed by exposure to a degree of cold, at or below freezing point; or, if the exposure is prolonged, even at a temperature somewhat above freezing point. Just as moisture is essential to the life of germs, as of all living things, so dryness, or desiccation, is inimical to their development and growth; and hence a long period, or an intense condition of dryness, contributes to the destruction of germ life. For the same reason, disinfection is effected by sunlight, or, more correctly, by insolation, by which is meant exposure to the sun's rays—the actinic (or chemically active) rays probably, rather than the light rays necessarily. The "sweetening" effects of sunlight are well known, and it would be advantageous if the opportunity were more frequently given for the penetration of sunlight into stables, byres, kennels, and styes.

Of mechanical means of disinfection, filtration and sedimentation are processes by which germ-laden water may be purified, and in this sense they may be regarded as disfection methods. So also the flushing with water of drains, floors, walls, and fittings, in so far as it effects the "cleansing" of these or the removal from them of infective matters, may be considered a means of disinfection. In the same sense, ventilation, by effecting exchange of air, and perflation, or air-flushing, by causing the removal of stagnant, devitalized, vitiated, or germ-laden air from a building are auxiliaries to efficient disinfection which should never be neglected.

Internal Disinfection. — Disinfection of the respiratory passages by inhalation will be referred to when treating of the parasitic and other lung diseases, but it may be said here that attempts at internal disinfection of the body by the introduction of agents into the alimentary canal, or into the blood direct, have up to the present been illusory; at the same time it would be rash to say that there are no grounds for hope that such a means of protecting the system may be successfully accomplished in the near future.

— Disinfection of Premises. —

The method of disinfection of buildings, yards, and paddocks to be adopted as a means of preventing the extension of communicable disease will depend largely on the nature of the disease and its mannel of infection—whether by ingesis a fixed contagion or a volatile or floating infection—that is, whether it is usually conveyed by direct or intermediate contact, as with the contagious anthrax, or by atmospheric contamination also, as in the infectious pleuro-pneumonia.

The period of incubation, by which is meant the time during which, after infection, the disease remains latent before the appearance of symptoms, and the channel of infection—whetker by ingestion, inhalation, or inoculation—are also matters which must be taken into account in determining the method of disinfection to be carried out.

When dealing with a so-called infectious disease—that is, where atmospheric contamination or infection has to be counteracted—fumigation of all closeable buildings should be performed. It is necessary, for effective fumigation that all openings into the building should be effectively closed. Bags may be stuffed into air holes, louvres, and other openings; and cracks and crevices in doors, floors, and ceilings may be pasted over temporarily with paper. The process will be best illustrated by instancing fumigation with sulphur. Rock brimstone or flour of sulphur is ignited and kept burning by different means, perhaps the most convenient and successful of which is to place the ignited sulphur on an iron plate or shovel, kept at a dull-red heat by the flame of a burning lamp or gas jet underneath. It may also be vaporized by placing it on top of a layer of live wood or coal ashes on a shovel or iron plate. The building should be kept closed for a period of one or two hours after the sulphur has been burnt. Five pounds' weight of sulphur completely burnt is sufficient to

horoughly disinfect a shed containing 1,000 cubic feet of air space—that is, a building 10 feet by 10 feet by 10 feet. This seems a large quantity of sulphur to use, but accurately conducted experiments have shown that anything less than 5 per cent. of sulphurous acid gas (SO_2) is inefficient for destruction of disease germs. If steam is liberated into the compartment at the same time as the sulphur gas, then half the quantity of sulphur will suffice, as the germicidal effect of the gas is more pronounced in the presence of moisture. On the whole, perhaps spraying with formalin is the most effective method of aerial disinfection. A 3 per cent. solution in water is used, and the finer the spray, and the greater the force with which it is projected into corners and crevices, the better.

Additional measures for the disinfection of buildings comprise the removal of all loose fittings, and the burning of such as cannot be thoroughly cleansed and disinfected with boiling water or otherwise; the burning of all refuse, litter, sweepings, or other debris likely to convey infection; the thorough scraping, scouring, and cleansing of walls, floors, ceilings, fixtures, and under side of roof with hot water and soft soap; and the swabbing of all such with a strong disinfectant solution—1 in 1,000 of corrosive sublimate, or 1 in 20 or 40 or carbolic acid, creolin, phenyle, Jeye's fluid, Macdougall's dip, chloride of lime, or caustic soda, in such a way that all crevices and corners and projections are reached by the fluid. The walls and floors may then be painted, or lime-washed with hot carbolized quicklime, or coated with heated tar.

Yards, if paved, should be flushed and brushed with a corrosive sublimate solution. If the floor is of earth, the surface mud or soil, to a depth of 6 inches or more, should be spaded off, removed and burnt. The bared surface should then be charred by covering with straw or litter, sprinkled with kerosene, and fired. A thick dressing of quicklime may be applied, and the surface made up with fresh, clean earth, well rammed and graded.

Drains.—Surface drains should be first swept clean, and copiously flushed with water, then flushed with corrosive sublimate solution, and afterwards made impervious by coating with heated tar. The disinfection of underground drains presents greater difficulties. They should be scraped, if possible, and then slowly flushed with a strong solution of caustic potash or caustic soda, after which flushing with water and corrosive sublimate solution may be carried out.

Fences and walls of post and rail, pickets, bricks and corrugated iron, may be effectively disinfected by first removing all dirt and then swabbing with corrosive sublimate solution, and afterwards coating with hot carbolized limewash or with hot tar.

Paddocks are difficult to disinfect, and little effectiveness attaches to the plan usually adopted by treating them with dressings of lime. The only really reliable measure is the giving over of the paddocks to cultivation for a series of years; but, if this is impracticable, the paddocks should be rested until a crop of grass or cereal has been grown, which, when dry, should be fired. Hollows and depressions may be given a heavy lime-dressing with good effect, or they may be sprinkled with carbolic or corrosive sublimate solution. In all cases the surface should be exposed as much as possible to the full effects of a summer's sun.

Water holes.—The disinfection of water holes and tanks is likewise a difficult matter. Little more than emptying, cleaning out the mud and sedimentary matters, and dressing the sides and bottom with quicklime or sulphate of iron, can be attempted; and the best plan to adopt in regard to a water hole known to be infected is, after carrying out the above measures, to fence it round so as to prevent access of stock for a period of about twelve months, by which time, so far as concerns most communicable diseases, the danger of infection will have been reduced to a negligible degree.

Finally, all buildings, yards and paddocks which are known to have become infected with disease germs should not be used for the housing, holding, or grazing of any animals of a kind liable to contract the particular disease in question for a varying period, depending on the virility of the specific germ concerned; and before their ordinary use is resumed they should be tested by allowing susceptible animals of low value to be placed in them for a length of time sufficient to cover the incubation period of the disease.

— Disposal of Dead Animals. —

Closely allied to disinfection is the question of the disposal of the carcasses of dead animals, parti-

cularly those which have been affected with communicable disease.

In Australia there is happily no necessity to discuss the merits of burial versus cremation. Except in the large cities, where animal carcasses are usually dealt with at boiling-down or destructor works, there are, as a rule, ample facilities for the burning of carcasses, and this method of disposal is usually adopted—that is, when any method is adopted. For it is unfortunately the case that in many instances no attempt is made to dispose of carcasses; they are simply allowed to rot in the sun where they lie, and are often thus a bountiful source of contamination of water holes, creeks, and other water supplies. in times past, in regard to pleuro-pneumonia, and even down to the present time in regard to anthrax, this criminally-neglectful custom has been largely responsible for the persistence of these diseases on some properties and along certain of the main stock routes.

A hint as to the construction of the cremation pyre for a bullock or horse may be of service. Immediately alongside the carcass a trench 2 feet wide, 2 feet deep, and 6 or 8 feet long, shallowing towards the ends, should be dug, and filled level with wood. On this and on the adjacent ground at the sides a foot thick layer of long wood should be piled, and the carcasses rolled on to it and covered above and all round with with a sufficient quantity of wood. A sprinkling of kerosene or tar to start the blaze, and replenishment of the wood as required, will complete the job. The advantage of the trench is that it obviates the necessity of lifting the carcass, and as the wood in it burns away it acts as a draught flue to expedite the combustion and render the cremation complete. Any of the surrounding ground surface that is soiled or soaked with blood or discharges from the dead animal, should be spaded off and thrown on to the fire, and in the case of communicable disease it is also a wise precaution to char the ground for some distance round by sprinkling with herosene and firing. Whenever possible, carcasses should be cremated where they lie, without removal. Removal always means additianal contamination of either vehicles or ground, and this involves extra trouble and expense of disinfection, and increased risk of spread of the disease.

Forestry for Farmers.

(From the South African Agricultural Journal).

— General Requirements for Tree Growth. —

Each species of tree makes its own special demands on the factors in nature upon which tree-life depends, and these requirements are very varied and distinct. Some trees live only in cold regions, while others must have great warmth to succeed. Some of them stand on the boundary of tree-growth within the Arctic Circle and others grow only in tropical lands and are unable to resist the lightest frost. Between these extremes a large number of species exist which vary in their needs only slightly.

Every tree may be said to have its "optimumu locality"; that is to say, conditions of environment under which it grows to perfection.

Conditions exist under which certain species of trees luxuriate; or the conditions may be such that the same species thrive only moderately well or grow to but an ill-shapen and stunted form; or again the tree may fail to grow at all owing to the conditions being entirely unsuitable.

Hence, it becomes necessary to study in a general way the factors in nature which govern the growth and development of forest trees. For the sake of clearness these may be derived under two main heads; climate and soil.

Under climatic requirements we will consider the bearing of heat, light, moisture, and wind towards trees.

— (a) Requirements of trees for Heat. —

When we have stated the fact that heat is essential for the phenomenon of growth, there is little of further importance to the practical tree-planter to be said on this subject. It is always the highest and lowest temperature, rather than the average, which decides where a tree will grow. Each tree varies in the limit of cold or warmth it will endure. Extreme cold more often decides where a tree will not grow than extreme warmth.

And in parts of this country where occasional sharp frosts occur, it is important to ascertain to what extent a tree is frost-resisting.

Sufficient heat is necessary for transpiration which in turn is necessary to cause the circulation of the sap bearing in solution the various plant foods. When the degree of heae is so reduced that transpiration it no longer possible, growth will cease and the tree remain inactive until sufficient heat returns. If a tree belongs naturally to a region where cold never occurs, it will not only become inactive or dormant during a period of cold, but the nature of its internal structure is such that it is killed. In this way temperature has a great deal to do with the distribution of trees over the surface of the whole earth.

The heat required by trees for transpiration and growth is supplied by the atmosphere, either directly or through the soil. The sun is the only important source of atmospheric heat, hence the temperature of any given locality depends in the first place upon its latitude, that is its distance from the Equator. Latitude may be, however, compensated for in many ways.

For instance, a region lying right on the Equator may be cold owing to extreme elevation or to the presence of extensive sheets of water. Or again, the temperature

of one particularly locality may vary according to its aspect and slope. For example, it will be observed that, generally speaking, the southern sides of a mountain range will be cooler than the northern, and a steep grade on which the rays of the sun strike which the rays of the sun warmer than a gentle slope or the level. Such considerations must be borne in mind when a site for tree-planting is to be selected or trees are being chosen for a given site.

— (a) Requirements of Trees for Light. —

The light of the sun is everywhere so abundant that we sometimes forget that without it there can be no growth. It is by means of light in contact with the green colouring matter (chlorophyll) in the leaves of trees that the carbon dioxide is decomposed. Thus the plant food which is taken in through the roots and conveyed in the sap through certain channels (the xylem) to the crown of the tree is assimilated, and returns down the stem through other channels (phloem) to build up new tissue.

During the process of germination light is not required, because the embryo is developed by means of substances deposited in the seed. Nor does the first start of growth in spring require much light as it is done by means of reserve materials deposited in certain parts of the plant in autumn. But as soon as these substances, both in germination and the first awakening in spring, have been consumed, light becomes necessary for the elaboration of new food materials. Thus a forester by planting trees close together is able to cut off the light from the side of the trees and so prevent the growth of lateral branches and promote growth on the top where there is light. Tall straight trees without branches are thus produced and nature has done its own pruning. On the other hand if large spreading crowns are desired for shade and ornament the trees are planted further apart so that each tree enjoys the full light and the trees become heavily branched.

Each species of tree, however, varies in its light requirements. In some cases too little and in others to much light can interfere with the phenomenon of growth.

The forester makes studies of light to discover the normal light requirements of any particular tree he wishes to plant. But it must here suffice to say that trees are dividing into light-demanding and shade-bearing species. Light-demanders must always be given the full enjoyment of light, while shade-bearers will grow under the partial shade of others. A further class is sometimes recognized, namely, shade-demanders, that is, trees that fail to grow in the full light.

Light is therefore an important factor in giving form and shape to a tree. Many of you will have noticed how vigorous and well-developed is a tree on the side exposed to the light, and how ill-shapen and stunted is the growth on the side subjected to shade.

Upon this principle of light depends the distance trees must be planted apart, according to the shape of tree desired, as well as the subsequent time and manner to thin out the trees some years later.

— (c) Requirements of Trees for Moisture. —

Without water tree-growth is impossible. The temperature may be normal, light abundant, and the soil perfect, but in the absence of moisture the roots cannot take in food, there can be no flow of sap up to the crown to be there elaborated in the light, nor can the necessary transpiration take place. Thus it would be futile to attempt to plant trees in any portions of the dry Karroo, even though the soil, heat, and light are sufficient.

As we look over the earth's surface we find forests do not exist in regions where the rainfall is lower than 18 inches, but usually only where the rainfall is a great deal higher than that do luxuriant natural forests occur. It may be said that forests are a consequence of an adequate rainfall, but it is by no means proved that forests are the cause of increased precipitation. What foresters do claim in this respect is that forests are capable of conserving the moisture that does actually fall.

The forester when planting en masse for timber production satisfies himself that the rainfall is sufficient for that particular species of tree. He finds it impracticable as a rule to depend upon irrigation. The farmer may, however, be able to establish small plantations in parts of this country where there is a small rainfall by irrigation, but unless he intends to irrigate it will be a waste of money to plant trees and expect them to grow to their full development where the rainfall is lower than 18 inches; unless, as we shall see under the next heading, the soil is of such a nature that it is capable of compensating for the low rainfall by its capacity for conserving moisture.

— (d) Requirements of Trees for Soil. —

We may consider soil from a physical and psyological point of view. The latter, though of some importance, has not the same great influence upon tree-growth as the former. It is to the physical conditions of the soil more than to its chemical compo-

sition that attention must be paid. A suitable depth and porosity is essential, while if these are present the chemical composition will be of secondary consideration, except, of course, in the case of excessive salts, lime, or other deleterious factors.

Depth of soil is necessary to give stability to the roots to afford a large supply of mineral plant foods, but more important still to hold a large and continuous supply of moisture. In this country our rain does not as a rule fall all the year round, but rather at certain (or uncertain) seasons.

In the east and north it is in the summer months, and in the west and south-west in the winter months. A good depth of soil will be able to hold moisture in reserve for the dry months.

A suitable porosity is necessary to allow the free passage of oxygen to the roots and to permit the entrance and percolation of water. If a soil is too compact, as clay, neither water nor air can enter. If on the other hand soil is too porous, as sea sand, water will pass through it as a sieve, and it will be incapable of retaining moisture for the the dry periods. An intermingling of fragments of rocks and boulders is often rather beneficial than a disadvantage to tree growth. The rocks assist in preventing the wash of soil, they retain moisture and keep the soil cool, while the roots of the trees will always find their way through the interstices and round and under the rocks.

Thus the bottom lands can be retained for agricultural crops, while the unploughable hillsides and mountain slopes may be devoted to forest trees.

— (e) The Effect of Wind Upon Forest Trees. —

Wind is both beneficial and harmful to forest trees. It is beneficial in as much as the motion of the atmosphere ensures a proper distribution of moisture, carbon dioxide, oxygen, and nitrogen over the earth. It is, of course, of paramount importance, as without air currents there could be no life. Considering the matter from this point of view is, however, of no practical importance. Nature can be trusted to do her duty in this respect.

Wind affects forest trees injuriously in two ways—

(1) by changing the temperature and degree of moisture unfavourably; (2) by injuring, breaking, bending, or uprooting trees.

In the first place dry winds reduce the moisture while cold winds reduce the temperature and thus interfere with the healthy growth of trees.

Strong winds may break the leading shoots or cause a tree to assume a curved shape, and violent winds may overturn and uproot trees. Strong prevalent winds will cause trees to be very unshapely by the growth being healthy and well developed only on the leeward side.

These evils can to a great extent be overcome by planting hardy trees on the outskirts of the forest to form a curtain which will prevent the entrance of either dry or cold winds. For the same purpose the trees are left denser on the edge of the forest when the time arrives to thin out some of the stems in order to increase the light. For similar reasons forests are cut in the opposite direction to the prevailing wind.

Plantations of trees may be established either by planting or sowing. For both methods, speaking generally, the ground must be equally well prepared.

— (a) Preparation of the Soil. —

Where possible, the ground should be well ploughed and allowed to lie fallow for six or twelve months in order that the virgin sod may thoroughly rot.

Just before planting or sowing, the ground should be cross-ploughed and harrowed.

Where ploughing is impossible because of the surface stones and rocks, owing to the steepness of the mountain side, the natural vegetation can be burned off in the dry season and well picked to a depth of six or seven inches just before planting or sowing.

Good preparation of the area ensures a better germination of the

A WINTER NECESSITY—THE RUGGING OF COWS.

seed, and in the case of plants a more rapid and more uniform growth.

In some cases it is possible and advantageous to take an agricultural crop off the area before planting. This reduces the cost of preparation and keeps the ground free from weeds.

In areas comparatively free of natural vegetation it may be possible to dispense with ploughing or picking, and work the ground only at the spots where the plants are to be inserted. This last method, however, involves great risk of failure, and experience shows that, as a rule, complete working of the soil secures a more rapid formation and is less expensive in the long run.

— (b) Season to Sow or Plant. —

The best time to plant is just before or during the rain, and, if possible, in the early spring. The season for planting extends over a period of three or four months. In the Western Province it is June, July, August, and September. The month of August is, however, the ideal time.

In the Eastern Province and the Transvaal the season is later, as the rains fall in summer. It is usually good to wait until one or two heavy rains have fallen so that the ground is well saturated. Planting or sowing may commence in November and continue till March. Late planting or sowing must be avoided, as sharp frosts are liable to occur in the north and in parts of the east, and very young plants are more liable to suffer.

— (c) Methods of Sowing. —

The sowing may be done either in rows or broadcast. It is usually better not to harrow after sowing as there is a danger of the seed being buried too deep. In most cases it is best to leave the seed on the surface, just as nature does when seed is blown from the parent tree. If scorching is feared or the plundering of birds, the area may be lightly gone over, after sowing, with bushes or rakes.

Broadcast sowing gives a uniform even forest, which later on ensures an even distribution of the light. Sowing in rows has the advantage of saving seed and of its being possible to cultivate after germination.

On the whole the best forests have been established in this country by broadcast sowing.

Sowing is less costly than planting when the seed is cheap, such as cluster pine. If seed is very costly or if the grains of seed are too minute to be well sown, plants must first be raised in a nursery.

Great care should be taken that the seed is evenly sown over the area. If the seed is badly sown the trees will be in clusters while parts of the ground will be bare. The result will be that the forest will be too dense in places and too open in others.

The quantity of seed to be sown to the acre varies with each species, the nature of the soil, and according to the vermin which is likely to feed upon the seed.

A poor germinating soil must be more thickly sown than a good soil. This is to allow for the seed that does not germinate and to give the soil a denser cover. Or if the area is over-run with mice, baboons, and birds, due allowance must be made for the quantity of seed they will devour. In the case of cluster pine sowings a fully stocked area is usually obtained when 18 to 30 lbs. of seed is sown to the acre. If the sowing is done in rows 3 feet apart the quantity per acre may be reduced to 10 to 15 lbs.

In the case of wattles 5 to 7 lbs. per acre is sufficient.

— (d) Method of Planting. —

In planting out, the roots must be disturbed as little as possible, least of all the fine rootlets through which the nourishing substances are assimilated. These fine rootlets are generally embedded in small lumps of earth which should not be shaken off. The least interference with the roots occur when the plants are lifted with a ball of earth in which the root system is embeded. This can be done with a garden trowel. A hole is first opened in the prepared ground with a spade, trowel, or bush pick to a depth sufficient to accommodate the longest roots. The soil is then firmly pressed about the roots so that all air spaces are filled, ; and at the time taking care to keep the plant erect and not to damage the top by pinching.

If the sun is very hot the plant can be advantageously mulched by placing a little grass or some weeds round about it.

The best sized plants are those that are about 4 to 6 inches high in the case of pines, and 5 to 8 inches in the case of gums. A strong healthy plant is one that has a good root system, that is, abundance of spreading roots.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

Red Water in Lambs.

Under the term red water, several diseases are included; indeed, red water (sanguineous ascites) is a result of disease rather than a disease itself. It frequently happens that whenever a shepherd on opening a sheep's carcase finds an accumulation of water in the abdomen he at once sets this down as the cause of death, and overlooks the disease which has produced the water. Probably the disease in some lambs is caused by derangement of the liver, and the following should be a good medicine with which to drench them once or twice a week:—Sulphate of magnesia, 4ozs.; extract of taraxacum, 1oz.; carbonate of iron, 2 drachms; water, 1½ pints. Dissolve the magnesia and the taraxacum in water, and then the iron. This is one dose each for six lambs. Avoid all watery and innutritious foods.—Exchange.

Manufacture of Koumiss.

According to a writer in the "American Druggist," koumiss is generally made by adding yeast to cows' milk and then fermenting. The best results are, however, obtained from the use of mares' milk, this being the basic ingredient of the original Russian koumiss. Mares' milk is less rich in casein and fatty matter than cows' milk, and is, therefore, more easy of digestion. In the United States cows' milk is used always, and generally it answers the purpose well; but it is better to dilute the milk with water to reduce the percentage of casein, etc. Mares' milk contains 8.75 of milk sugar; cows' milk contains only 5.35. It is therefore necessary to add sugar to the preparation when made from cows' milk. The following recipe has been found to answer well:—Dissolve 3ozs. of milk sugar in 32ozs. of water, and add the solution to 96ozs. of milk, rub together ½oz. of compressed yeast and 1½ozs. of brown sugar in a mortar with a little of the mixture, and then strain into the other portion. Strong bottles are essential, champagne bottles being frequently used, and the corks should fit very tightly and be wired down. If the cork does not fit properly, the carbonic acid gas, as formed, will escape, and leave a worthless preparation. The koumiss must be kept at a moderate temperature, and to ensure it being properly finished the bottles containing it should be gently shaken each day for about ten.

A Healthy Occupation.

An American exchange says the healthiest of trades is tending cow stables. Here the average length of life is over 85, and it has been observed that many of the men who look after cows live to be centenarians. This is because the cow is the only animal whose presence is known to be thoroughly healthy for men. Even the breath of a cow is beneficial, though no physiologist can tell precisely the reason why. The labour of wheeling a barrow has such a strengthening effect on the muscles and joints that confirmed barrow-wheelers show an average of nearly 77 years, and a great many live to be a hundred. This largely is because if a man wheels a barrow properly the wide apart arms open the chest, and help to strengthen the lungs in a wonderful way.

Horse Feeding.

The whole subject of the proper feeding of horses is one which is not usually appreciated as it deserves. There is far too great a tendency on the part of those connected with the animals to ignore the fact that constitutions as well as appetites vary, and the result not infrequently is that a horse gets far more than is good for him, for the simple reason that he eats more than his neighbour if he gets the chance. If proper observation were to be made, it would soon be ascertained how much each animal requires in the way of food to be at his best, and if the size of the feeds were to be regulated in propertion, the health of many a stable would be better. Horses doing hard work, as a rule, require something like half as much food again as those doing moderate work, and the pace at which they have to work should also be taken into consideration; and, if a hose is systematically fed upon indigestible food in large quantities, his health will suffer.

Poultry Notes.

Breeding Stock.

Supply and demand are the two dominant factors in every business undertaking, and in this respect the poultry industry differs not in a single detail from other more imposing branches of commerce, excellent figures being obtainable for birds of what may be termed exclusive quality, owing to the supply falling short of the demand, whilst on the other hand over-production of the average "every day" specimen has been the means of reducing their market value to a point commensurate with that obtainable for any commodity with a tendency towards a glut in the market.

Careful investigation instituted to determine the factor responsible for this surplus supply reveals the fact that sufficient attention is rarely bestowed on the science of mating with a view of evolving a strain or line of birds that will gradually improve in quality each season and produce stock in which the percentage of culls will gradually diminish, until eventually by judicious breeding a faulty specimen will become somewhat of a rarity, and even when found need not occasion the slightest anxiety, as birds frequently revert to an almost forgotten fault possessed by some far back ancester. Such a specimen, if possessed of a desirable point in a decided degree, may with safety be utilised as a breeder, and in this capacity will not infrequently give a far greater measure of satisfaction the more sighly bird possessed of a less fashionable pedigree, owing to the fact of his breeding lines resting on a very solid foundation.

The majority of breeders, especially amateurs, when taking up poultry breeding as a hobby or profession aim at producing quantity rather than quality, and apply this principle to the procuration of stud stock, thereby imperilling their chance of building up a remunerative business, for experience has amply demonstrated that in poultry raising, as in other pursuits, though there is invariably room at the top, the lower rungs of the ladder are uncomfortably crowded and offer but the merest apology of a foothold, with consequent disastrous results in numerous instances.

Breeders in every instance if fully alive to their own individual interest, should adopt a cautious attitude on the question of stud stock, and decide in no unmistakable manner that the best obtainable were none too good for their purpose, as even if owing to limited means a single pair have to be procured, instead of the usual pen, the pursual of such policy would prove more gratifying than securing a larger quantity of inferior grade stock, and the enhanced value to the industry generally would speedily bear eloquent testimony to the wisdom of its adoption.

The reverse side of the picture claims attention, and forces itself on the observer's notice as the condition prevailing at the psesent time. On every hand are found novices operating with stock so inferior in characteristic of the variety they are supposed to represent that nothing short of absolute genius would enable any breeder to place operations on a solid foundation with them as the basis of a strain. The desire to secure quantity rather than quality for the money is the factor responsible for this order of things, and this tendency requires to be severely discouraged if rapid and permanent headway is desired, for very serious injury is being perpetrated on the industry by the persual of the present unsatisfactory programme.

Reputable breeders should also exercise greater caution in their methods if they desire to obtain the fullest possible measure of profit from their undertaking, and the primary step in this direction is a firm determination to slaughter each and every bird falling below what may be safely termed a medium standard for the retention and subsequent disposal of culls has ruined many a reputation that has taken years to build up.

If a breeder decided that only such birds as display conspicuous merit are to be reserved and disposed of, he has mastered the chief obstacle in the road to success, and can with every confidence expect to receive repeat orders from his customers, as merit proves the best advertisement, whilst weedy or defective specimens, no matter what price is demanded or received for them, are ever a source of dissatisfaction, equally to the breeder as to the purchaser.

The average amateur is especially blameworthy in his methaids of conducting business, for, aften at the outset of his breeding career, he in purchasing stock assures the breeder, either verbally or by letter, that he is in no wise particular about the show properties of the stock, but merely interested in their utility qualities. After receiving in most instances a faithful pen picture of the bird or birds, and expressing himself as thoroughly sgtisfied with same, he forgets that he has probably paid the lowest possible figure at which purebred stock can be sold, and roundly abuses the breeder for sending him birds that are not perfect in every respect, although they may prove particulaely strong in the most desirable utility qualifications.

Dependable hatching eggs are obtainable only from vigorous, hustling hens.

The only way in which you can be certain that your birds are free from lice is to examine them.

Notes in Passing.

ADDING INSULT TO INJURY.

Last week we noted that the Minister of Agriculture had promised to consider the request of the P. and K. Club deputation that the Government subsidy should be continued, and we mentioned that members were fairly hopeful of an affirmative reply. It is now apparant that they credited the Minister with a better understanding of the position than it had pleased Providence in its wisdom, or his responsible officers to provide, for Mr. Pascoe has now definitely declined to do so. In his letter he repeats his suggestion of amalgamation as between the P. and K. and Royal Societies and further generously offers the services of the departmental Poo-Bah as guide, philosopher, friend and general mediator. Considering that (firstly) the Royal in the most friendly spirit does not want to amalgamate with the P. & K.; (secondly) that the P. and K., also in the friendliest spirit possible, reciprocates the feeling; (thirdly), that no good would result from such an amalgamation, and (fourthly) that the committees concerned might be safely trusted, to conduct their own business without the assistance of the aforesaid Poo-Bah. Mr. Pascoe appears to have merely added the insult of a silly suggestion to the injury of an unjustifiable refusal.

A MISCONCEPTION.

From quite private and confidential sources we learn that the Ministerial idea of the P. and K. Club, shared by some of his colleagues, is that it is an association of multi-millionaires who habitually import 100-guinea Bull dogs, which they then present to their friends. As a matter of fact, and as far as the subsidy is concerned it is an association of worthy, but rather impecunious poultry breeders (we deduce the impecuniosity from the members' donation list), who in the past have been responsible for the maintenance in their purity of the various races of domestic poultry, and to whom in view of the alleged deterioration of their stock in stamina and vigour, utility breeders will in the near future have to look for assistance. If this truer recognition of the aims, objects and use of the club were permitted to penetrate the Ministerial mind it would be to the general good of the poultry industry.

AN INVITATION.

The recently established "Mail" (May its shadow never grow Less) laments the decadence of the White Leghorn in particular, and the disorganisation of the poultry industry in general and invites the Poultry and Kennel Club to act the part of Moses in journeying to a Promised Land of Improvement. It occurs to us in passing that considering that the Government made a world's record mess, though backed by unlimited capital, of "reorganising the industry," it is trying this unfortunate club, whose available funds would find ample accommodation in a penny money box, too high, to ask them to take on the job. Their leadership in the matter as suggested by our contemporary, however, appears to consist principally in the issue of approved breeding charts and the institution of instructional classes on the mutual help principal. We do not wish to be necessarily dolorous, but excellent as these proposals are in theory we imagine that in practice they are liable to fall as flat as the pancakes that danced before Pharaoh, or an expert's lecture on the tick question.

MUTUAL HELP AND SELF-HELP.

Mutual help and brotherly love are all very well in their way, but self help is usually the tyke which comes on top. Instructional classes and leaning up against a brotherly fancier, may be alright, but we somewhat doubt their efficacy as a prescription for the man who wants to get to the top of the ladder. At all events we never heard that Messrs. G. M. Duncan, Charlie Leslie, F. J. Wimble, A. H. Padman, S. H. Pitman, J. H. Hobbs, C. B. Bertelsmier to name but a few of our successful breeders ever joined any Poultry Kindergarten, or sat round and held hands when they tackled the question of breeding the best birds in the best way. This does not, of course, mean that the Mail man's idea is not a thoroughly sound one, but knowledge on the co-operative plan does not seem to appeal to the Australian poultry breeder.

MORE PRACTICAL.

Coming to the more practical side, we are wholly in accord with

the writer's straight-out advocacy of the singly tested bird as the basis of successful breeding and we heartily congratulate "Practical" on the thoroughness with which he lives up to his pen name, in the suggestions and advice which he offers in this regard.

WILD SHOOTING.

During the last six or eight years the Poultry expert has been rather generally regarded as an innocuous if somewhat verbose person, whose vagaries could well be treated with tolerant indifference. Recently, however, he appears to have acquired a gun, with which he has been indulging in some short range shooting at S.A. Birds and Breeders' Shows and Showmen. According to Sir Oracle, men, methods and material are all wrong. In fact everything is all wrong! Poor S.A.!! Now a gun in the hands of a fool or a poultry expert (they are not necessarily identical), even when loaded with simple spite, is a dangerous thing, and we fancy that the tolerant attitude of past days is likely to turn into something much more solid and unpleasant. In the meanwhile, perhaps, Mr. Laurie will inform the public why he has during the last few years spent, say, £1,000 on "all wrong" stock and necessary equipment at Roseworthy? Secondly, what he has to show for his presumably "All right" methods?

QUITE ABSURD.

The folly and absurdity of the expert's recent vaperings may be, perhaps, more accurately judged, when we remember that (firstly) S. A. leads the world in laying stock; (secondly), that the S.A. breeders have exported birds to each of the five continents, and (thirdly) that S.A. exports more eggs per capita than probably any country in the world. In the face of such facts one is inclined to wonder at the true cause of our expert's recent erratic shooting.

A PROPHESY.

In view of the recent talk of the lack of stamina and ovarian troubles in highly bred stock we recall with interest an article by Prof. Brown, the English poultry authority, which we republished some four or five years ago, in which he foretold the position which is possibly approaching in S.A. stock. The professor indicated in the article referred to that it was only those breeders (probably not five per cent. of the whole) who ruthlessly culled their stock for every physical defect, and every constitutional weakness who could hope to live with the leaders when they got to the 250 gait. It certainly appears that Prof. Brown was not far out in what he then wrote, and that the growing weakness of Leghorn stock in particular may be traced to forced feeding, immature breeding stock, and the hurry and haste to get to the top of the tree quick, which present competition conditions encourage, have been serious obstacles, to a thoroughly permanent improvement.

OPEN SHEDS.

When it was announced that at long and weary last the Poultry Expert had decided to add to the interest of the Roseworthy laying competition by including a scratching shed versus open pen section, considerable speculation was expressed as to what particular bungle he would make in carrying out the affair. That there would be one, two, or ten mistakes, was one past form taken for granted. It now appears that the scratching sheds provided are hardly adequate to requirements. It is agreed by most authorities that for 6 birds a 6 x 10 space with plenty of head room is the minimum that should be allowed. Whether a Roseworthy scratching pen fulfil these conditions we do not know, but have been given to understand that their arrangements fall short of perfection. Possibly Mr. Laurie may argue that there were not sufficient funds available to put up ideal sheds; as, however, close on £1,000 was placed on the Estimates last year for contingent poultry expenses at Roseworthy little attention need be paid to this, for a poultry man of average ability could be trusted to run a small experimental earthquake, let alone a dozen experimental scratching sheds on so handsome an amount.

It is impossible to obtain satisfactory fertility unless a sound constitutioned male bird heads the pen.

Don't overcrowd. Proper care and space given to a few will return more profit than is obtainable from a large number neglected.

Golor Feeding of Black Fowls.

The subject of feeding for color one hears discussed by groups of fanciers congregated for friendly chats year in and year out. Some will argue that what you feed has no effect on the color, while others will insist that it does.

As far as black birds are concerned, I have been convinced for years that the kind of feed for young stock when taking oo their mature plumage and the old birds during molt has much to do with the color.

Several years ago I had a late hatched S. C. Black Minorca cockerel that had the promise of making an extra fine bird, but too late and immature for use that season. On account of his extra large frame and good color I put him out on a farm to hold over for a good bird. The following fall this bird was fed whollly on yellow corn, during his molt and when I came to look him over after molt I found, much to my surprise, that he was off in color, showing purple barring to quite an extent, but otherwise he was a grand bird. As he was bred from a line of blood producing excellent color and showed such promising color as a cockerel, I decided to hold him over another year. The following late summer before he had started his molt, I brought him in and placed him by himself in a roomy coop with good grass run attached and fed him mostly on wheat with now and then a feeding of buckwheat or oats, all through nis molt, and the result was that this color was almost perfect—a rich, greenish sheen, free from any barring of purple, and he won the blue that season at one of our leading shows in hot company.

This aod other similar experiences long ago convinced me that yellow corn fed wholly or freely to black bitds when they are taking on new plumage, will affect the color and produce purple or bronze barring. To just what extent this is true I have never tried any experiments to find out untill this year.

Interesting Mating Problems.

By S. T. Barlett, in Reliable Prultry Journal.

If not already done, the selection of your breeders cannot be made too soon. It matters little what variety you may be breeding, there are a number of foundation facts and principles that cannot be neglected if the best results are to be seen in your stock next fall.

Bear in mind that it is far better to breed from a very few choice birds than to "run chances" of getting a few really good ones from a large flock raised from a more numerous parent stock. If you have only a trio of strictly first-class birds, confine your incubation to their eggs. Too many poultrymen forget that it is a very exceptional thing for a chick to be better than its parent. It is only by strict adherence to nature's laws that we can make improvement in our stock.

— Study Individuals. —

To improve from year to year, every breeding bird must be individually studied and mated to one of the opposite sex that is strong in the weak points of the bird under study. For there are very few birds that even approximate perfection.

Given two ideal breeders of the same family or strain, we might expect a fair percentage of similar quality chicks from them. But who has these ideal birds? The very few in existence command a purchase price away beyond the capacity of the purse of the average poultryman. What is the problem therefore confronting him? Simply this: "When the best things are not possible, the best use must be made of those that are." Do the best you can with what you have. First, make an intelligent and thorough study of your male bird. You know what he should be. But if you are as keenly critical with your own as with your neighbor's birds, you will see that he has his failings, and will not shut your eyes unwisely to them. Whereever he is weak you female may be strong.

It may be that your male is a buff bird, good in color but deficient in shape characteristics. If such he the case, by no means mate him to a female similarly affected. Generally speaking you will find the hen transmits her type to her chickens. Never use a poorly shaped hen in the hope of seeing a striking improvement in the type of her progeny. You will be disappointed. If you are limited to one male bird, you must pay special and minute attention to the females. Again, remember that you will get better chicks from adult parents than from young ones.

— Breed Mature Birds. —

Hens are vastly preferable to pullets as breeders and cocks to cockerels. The general inclination is to mate cock with pullets or cockerels with hens; but we are convinced that better quality and more strongly constituted chicks are given by adult birds than by those of any other age.

Until a male has molted once as an adult you cannot positively pass on his quality. The color pigment in his blood may or may not be intense enough to stand the strain adult molt. One cannot tell until the bird has been tested by age. Many of our readers have congratulated themselves on the possession of particularly strong colored cockerels only to find them lamentable failures as cocks. The same is true with the females. We have had deep colored buff pullets that as such have greatly pleased the eye; but as matured hens they have wofully deteriorated in quality. A bird of color that holds his own fron year is a mine of wealth to the poultryman.

The writer has a hen that is now seven years old and a cock past five, and both are as nearly perfect as they were six and four years ago respectively. Such birds as long as they will breed at all are priceless. For such reasons, we advise if possible, breeding only from tried adult parent stock.

— Individual Matings. —

If you are not limited to one male your range of operations is of course more extended; but do not forget that a few choice birds are immeasurably better as breeders than a lot of mediocre specimens.

From a long experience, the writer is prepared to say that the highest possible results can be secured only from individual matings—one cock and one hen only, running together. If the breed is of a solid color, standard bred birds may do very well together. In whites, of course, shades of color are not to be considered, for white is white although many think they have it when really they have not.

— Mating Buffs. —

If it be a buff variety it is well to bear in mind that the tendency is for the chicks to be a shade lighter than their sire. Hence a bird a bit darker than desired for the exhibition pen may be quite the thing in the breeding pen. But do not make the mistake of mating extremes of color in buffs. If you do you will not strike a happy medium between the two;

but your chicks will in all probability be a badly discolored lot. Shaftiness, mealiness, and most other faults. In blacks do not mate two birds of extremely brilliant metallic green. If you do your cockerels may have red hackles. In the sire one cannot have too much sheen; but such a bird should have with him a dull black female.

—Mating Parti-colored Varieties.—

In the parti-colored varieties the need of individual selection and mating is even more intensified. Having a Light Brahma male for instance somewhat undersized perhaps but with good, clean, distinct lacing on hackle tail coverts, saddle, etc., and a hen large, strong, and good in her black one can afford to dispense with the lacing in her. She will give Brahma type and the cock impart the fine points of the breed to at least a fair proportion of their progeny.

In short, all matings to be practically successful in improving any variety, must be more or less on the compensation plan. "Two and two" do not always "make four" in breeding poultry. And do not expect too many really high class chicks from any mating. Do the best you can and there will always be a large number of culls. In the newer breeds this is particularly true.

After a long series of experiments as an amateur fancier aiming at Standard excellence, the writer has learned that if he raises ten per cent of good show birds, he has done well. And yet there are found men who want a sitting of eggs for a couple of dollars and then "kick" because every bird raised is not a winner. Such is life.

Select your breeders early; do not force them into laying soon; mate them intelligently and if possible in pairs, and doing your best you will not be altogether disappointed next year.

The first eggs laid by a pullet should never be incubated.

Guinea Fowls.

Although Guinea Fowls are not very popular, they are not unprofitable birds to keep, since their flesh makes excellent eating and their eggs are rich and delicate. The meat resembles that of the pheasant, and forms a pleasing variety of food. The best way to secure a stock of Guineas is to procure sittings of eggs and set them under Game hens or bantams. The period required to hatch them out is twenty-six to twenty-seven days.

When hatched, the chickens should be placed in roomy coops. Feed them frequently—for the first few days once or even twice an hour is not too often. The food should consist of a mixture of oatmeal, finely-chopped hard-boiled eggs, groats, millet, soaked bread, and pressed curds. After three or four days the eggs may be discontinued, and their place supplied with ants' eggs, and as a change clean gentles. As green food there is nothing to surpass young nettles and mustard and cress chopped very fine. As they grow older a small quantity of cooked meat may occasionally be given to them.

It will generally be found that cocks greatly preponderate in all broods of Guinea Fowls. Some times only one turns out to be of the feminine gender from a brood of a dozen or more. However, the surplus males may be utilised for the table, and one cock and from two to four hens may be retained for stock purposes.

Adult hens lay from seventy to ninety eggs during the season before evincing any inclination to broodiness, if one egg is always left in the nest. Care should be taken not to startle or disturb the Guinea hen while on the nest, or she will forth with seek a new and perhaps inaccessible spot wherein to deposit her eggs.

The distinguishing point of the cock bird is that his wattles are longer than those of his mates; also the cry is somewhat different, the female uttering the familiar "Come back," while that of the male is a shrill shriek. The colour varies from a dark bluish grey to a lavender hue, while white Guinea Fowls are to be met with, and are very attractive looking birds. The eggs are of a coffee-and-milk shade, and pointed at one end.

If kept in a paddock or large enclosure, with trees and shrubs and a few hiding-places, Guinea Fowls repay their owners remarkably well, since they are very hardy and prolific. The feathers of one wing should be cut to prevent the birds flying away until they are thoroughly tamed and used to their domain.

Stock birds may be fed on the ordinary poultry food, and those intended for table purposes should be kept for a short time in an enclosed space or loose-box, and very freely supplied with buttermilk, curds, lettuces, steeped oats, and chopped fat or suet—that is, if kept on a farm where such fat-producing materials are usually to be met with. But when kept by others whose resources are limited, the birds will fatten well on meal (oat and barley) mixed stiffly with house scraps. A small drinking fountain constantly replenished should be always within reach.

If kindly and quietly treated these birds will become tame and greatly attached to their owners and feeders. They prefer roosting in trees to a poultry-house when the choice can be allowed. Their weight when fully grown is usually about three and a half pounds.

For market birds, size and vigor are the chief requisites.

It is suicidal policy to turn birds out on free range and let them "shift for themselves," if their owner expects to derive a profit from them.

The contention that a breeder can best succeed with the variety that he has a strong fancy for is one that admits of no debate.

Keep your layers vigorous and healthy and they will amply repay you for your trouble with abundance of eggs.

Helps to Beginners.

PRACTICAL ADVICE FOR YOUNG POULTRYMEN.

(By W. H. Guyer, "Inland" Poultry Journal.)

"Do real poultrymen ever smile?"

Things are not all dark in our business; we are not always paying out money if we have any tact at all in the work. Chickens come home to roost, and money if wisely spent in poultry will come bringing more with it at the proper time.

The first year takes a lot of grit. It is money out all the while in the most of cases. You must buy your stock, incubator, brooders, feed of all kinds; then comes in the question of buildings, which is no small item. The bills come in thick and fast, and you wonder if the tide is ever going to turn. But September comes and your chicks are now hustling big fellows, and you feel proud and more hopeful than ever before. October comes and letters are coming in each day, asking about the kind of stock you have and the prices. You make reply to all these telling in every instance just what you have and what you ask for them. In a few days a letter comes containing 10dol. for a pair of your own birds, and you are all smiles to-night. You linger in the poultry yards, you stoop down and stroke the glossy coats of your big Dicks and Harrys, you give them a little extra feed, you even talk to them in a way that would make your wife smile or your neighbour roll and laugh were he to hear you.

As you walk towards the house you feel like kicking yourself for even thinking of feeling blue over the business.

You ship the birds and in a few days more your customer writes you that the birds came all O.K., and he is much pleased with them. You are more happy now than ever before, your smile is something colossal. You feel good towards everybody in the world, you would like to get right down and write a long letter to the editor of the poultry paper in which you placed your ad., calling him all sorts of endearing names. You rebuke yourself for even ever hinting that it was all poultry-keeper talk to run ads., or help the A.P.A. You recall the time when Joe Houzer's pup got among your pullets and tore some of the finest ones ere your wife knew it, and how you did down in your heart curse that pup and then condemn the whole poultry fraternity as a fake and many other things which would not look well in print. What a fool you were! You read the letter over again to make sure it is 10dol., and not one dollar, with a cipher left off. "I am right, it is a X."

Dear beginner, this is not imagination; this is real life. A fellow has a right to smile when he can raise and sell good stock; he has a right to feel proud that he can raise stock that other people think are worth 5dol. or 10dol. each. He has a right to thrust his thumbs under his shoulder braces and stalk through his yards with an air that makes him lord of all he surveys. And let me tell you that the more difficulties you have encountered aod overcome, the greater and more lasting will be your joy when once you have the greenbacks tucked snugly in your wallet and your heart at ease because you have done right by the other fellow. Smiles are no longer grins, when you feel that you have given your customer the best birds in the yards for the price asked. However often the temptation may come to do other than the right thing, don't sell your birthright for a purse of silver. Your sins will find you out, and your smiles will be turned to tears, and you will return to your poultry yards the meanest feeling man under heaven.

There are joys in the poultry world, and you, beginner, have a right to your share of them.

— Keeping at it. —

It pays to stick to your business whether in the poultry business or in the grocery business. The enthusiasm of some poultry beginners lasts but for a season, some stick to it for two years, while others hammer away five years, while others are at it for a lifetime.

No man can make a success of a thing like poultry in one year.

I cannot tell you how many letters I got this season from fellows who were "sick of their job," and offered their birds at a great sacrifice. I have tried to find out the reason for such a state of affairs, and these are some of them.

First. They don't count the cost. They count up the profits without counting the cost. Says one fellow:— "Mr. M— down yonder kept one hundred hens last year, and cleared two dollars on every tail of them." This fellow in question went into it with the same end in view, but he was as ignorant of a hen as an Indian of an automobile, and the result was he lost about all the feed he put into them and gave it up as a bad job, saying: "Them lousy hens did nothing but eat and eat and pick and pick." The poultry business is not a gold mine where the nuggets are lying along in rows like Burbank potatoes! A man will put his money in the bank at four per cent, and when he puts it into a hen he expects twenty or even thirty per cent. I have no doubt some old timers make a big per cent, but what foolishness for a beginner to expect such profits the first year. Dear beginner count the cost.

Second. They have no definite aim in view. One fellow starts to raise poultry for the market and buys a lot of heavywiegnts, and by the time the year is half gone he meets with a fancy breeder and hearing him tell of the ribbons won, the big prices he gets for eggs, he says, "What a fool I am! Here I am raising hens for 10 cent a pound and that fellow is selling them for 5dol, 10dol, and 40dol, each. I get 30 cents a dozen for fresh eggs, and he gets 5dol. for every 13. Good-bye, old heavyweight, give me a show bird." and immediately he sends hard-earned cash for a lot of show birds, having no idea what he wants or what he is getting or what to do with them when he does get them.

This is a day of specialising, and every young person ought to take such facts to heart.

Third. Lack of attention to details The old poultryman knows that it is eternal vigilance that counts year in and year out. There are many enemies lurking in the way and these enemies, as a rule, are nor as big as elephants, hence you must keep your eyes open to see them.

There are many other causes for such failures, but these are ever before me as I investigate these matters.

Young man, burn your bridges behind you. Go into it to succeed, and you will "I just knew I would fail, and I did." To be sure, he was half whipped the minute he entertained such an idea. I can, is what counts.

Let not rats, cats dogs, shunks, mites, disease, things present or things to come put you out of the fight.

Others have won, but through much tribulation, and you can, too.

Pue these thoughts into deep spots in your gray matter, and you will find yourself succeeding.

— Poultry Houses. —

The principal requisites for a good poultry house are the same whether the house is for the city fancier or the poultry farmer, the small breeder or the breeder of hundreds. Whether we are breeding for fine feathers, eggs or meat, our foundation must be strong, healthy, vigorous stock, and to obtain and retain this health, sttength and vigour it is necessary to have suitable buildings.

"Dry, draft-proof, clean, convenient" These four words should be the "handwriting on the wall" to everyone who contemplates the erection or maintenance of poultry home. The locations and plans may be numerous and varied were the styles of speech in vogue at the Tower of Babel, but it either plan or locatian cannot be made to meet these four requirements it had better be abandoned.

A poultry house must be kept clean, consequently it should be arranged as conveniently as possible to admit of this being done without unnecessary labor. Another important point is this : A house may be arranged to carry its normal quota of fowls in good order through winter, but it will almost always become crowded during the fall when the young flock is maturing, and before the final culling and sales have disposed of the surplus. As at this season we generally have a great deal of wet, nasty weather, it usually follows that the beginning of winter, when it should be at its very best. To avoid this state of affairs, extra dropping boards and roosts should be provided, and extra care and labour expended to keep the house clean and free from vermin.

When new houses are to be built the ground should be graded up, foundation laid, frame erected, and roof put on as early in the summer as possible, and if the floor is to be of earth, it should then be filled in to the desired depth or a little more. Now sheathe the north wall, and if necessary the balance of the work can be left till fall, and even if not necessary, if is advisable, as it allows the interior to become thoroughly dry and sweet during the hot summer months. If it is necessary to complete the building at once, then all windaws and doors should be left off or wide open during the summer.

Incubator Hints for the Month.

Get machine ready for hatching.

See that it is perfectly clean inside.

Get a new burner if you have the slightest doubt of the old one.

See that the spiders and mice have not built their homes in the flues or ventilation holes.

Get a new wick.

Put the incubator in a room in which you can keep the temperature as even as possible.

A thoroughly ventilated, sweet cellar makes an ideal incubator room.

Before you start hatching, get this clearly into your head : An incubator won't hatch by itself it is merely a machine for you to hatch with. If you buy a spade, do you put it out in the garden in the evening and get up next morning to see how much ground it has dug ?

An "incubator expert" is only a clean, methodical, time-giving man. If you are not an "expert" now, become one at once, or sell you incubator.

Some men can't work a sausage machine successfully, and yet blame their incubator for a poor hatch.

Can you honestly say that you have gone through the whole hatch without having shirked your attention upon a single occasion.

Moisture is only necessary to prevent the hot air from drying out the egg too much ; you don't put moisture into the egg.

When the salt on your table is damp there is no need for moisture in any make of incubator, and when it is dry there is.

Moisture plays a very small part in incubator results, yet what a lot of talk we sometimes hear on the subject.

As a general rule moisture is never wanted in South Australia in the winter, and generally, if not always, during the summer, when your incubator would be better having its holidays.

If your hatch is due on a warm day with a dry north wind blowing, then use moisture in the pan ; that won't be along just yet, though.

If you have never worked an inubator, now is the time to buy one so that you may have one hatch to get you used to the work before the main hatching starts next month.

Ifyou possess an incubator you have no excuse for late chicks.

Start hatching the heavy breeds at once. Early hatched chicks bring in have no excuse for late chicks. disease and dissappointment.

A breeder bought a 100-egg incubator and put in 50 eggs from his White Leghorn pen and 50 eggs from Brown Leghorn pen, and informed his friend. A little later his friend asked him what he thought of his machine. "No jolly good ; only got 45 per cent. hatch." "How many White Leghorns." "Oh, 40." "How many Brown's ?" "Five, of course." "Why, man, you got an 80 per cent. hatch with your white eggs, and only 10 per cent. with your browns. Must have something wrong with that pen." "Never saw it in that light before." Now he looks inside the wire netting for the cause of a bad hatch.

Successful poultry raising and egg production go hand in hand with care and shelter.

Colouration in Relation to Egg Production.

By A. S. Galbraith in "Poultry."

"Fine feathers make fine birds," and sometimes denote fine layers. Of all the external characters which have been drawn upon to guide us in selecting layers, colour has perhaps been least often emphasised as showing any marked variation in relation to reproductive powers. Former experiences of my own having been so curiously confirmed by the records of many of the pens in last winter's laying competition, I have compared notes on the subject with some breeders of wide experience, and find that their observations coincide with my own.

In considering the laws affecting secondary characters, such as the plumage of male birds, Professors Geddes and Thomson ascribe their brilliancy of colour to excessive energy which leads to the laying down of more pigment in the energy expending male. This vital energy being an inherent part of living things, permeating the whole being, one would naturally expect that the vitality that shows in the great reproductive powers of a good layer, would be evident in her plumage also. I have found that in many breeds colouration does appear to be distinctly associated with reproductive powers.

My attention was first drawn to this in the case of three broods which came into my possession. All were bred under conditions that were not favourable to the development of great vigour, and as they were not nearly hardy enough for my farm, the laying of the best was not record breaking; but in each brood there was one very poorly coloured bird, who proved to be such a bad layer that all three were killed. When examined they were perfectly healthy, but the egg cluster consisted of only a few pin-head eggs, at a time when the others had been in full lay for months. They were Campines, buff Orpingtons, and cross buff Orpingtons-Campines.

From the best layers in each brood eggs were set, all crossed with a Scots Grey cock. This gave the required hardiness. Out of thirty pullets kept, two were very poorly coloured. These had not commenced to lay in January, so they were killed, showing on examination, like those of the previous year, only the poorest cluster of undeveloped eggs. Since then I killed several birds who were poorly coloured, at six to eight months, and have always found the same to be the case.

Of these cross-breds, the Scots Grey-Silver Campine produced on the one hand birds with slatey-blue bodies and black heads, who were excellent layers; and on the other birds with barred bodies and white heads who were moderate to poor layers. The latter produced all their eggs in spring and summer, while the former laid fairly well in the winter.

In speaking of a breed which is very similar to this cross, namely, the Braeckel, M. Vander Snickt mentioned at Reading those birds who, with grey bodies, barred, flowered or ashen grey, have white necks, as being typical; then he added, "Very often birds are seen with a black head on a gold or silver neck. These are the best." This is precisely what I had found with the cross-bred pullets. The dark headed, more intensely coloured pullets, showed greater vitality, were better foragers, better winter layers, and stood the inclemency of weather to which they were at all times exposed sleeping as all did in the trees, summer and winter.

Among other breeds, in the meantime, I found that the lightest, that is the most poorly coloured, of each brood were the poorest layers, and in some I noticed that the converse held. Thus, out of five silver Wyandottes one very darkly marked one was far the best layer, two somewhat light ones came next, while one nearly white on the breast, and with light fluff, was not worth keeping. I do not mean to imply by this that black birds are better layers than white. There appears to be in every breed a mean of colouration which is the expression of moderate physical well-being and vitality, and in those which have come under my notice, all diverging from that point in the direction of paleness of feather (not light colour, but poor colour), show a lessening of vitality, which is further borne out by poor reproductive powers; while those diverging in the direction of greater intensity of colour are markedly better layers. When we remember that colour implies rate of vibration of light waves we can comprehend why it may indicate greater or less vitality.

On comparing notes with others I find that their experiences with most black and white breeds have been the same. One breeder tells me that when he mated up two pens of Anconas, one with yellow legs and the other with mottled, the former produced hard feathered, dark birds, who were good layers, while the latter produced soft feathered, light birds, which were poor layers. Among the barred greys this also appears to hold good. In Scots Greys pure, the black headed cockerel with reddish hackles produces, not only the best coloured birds for show, but also the best layers.

In cross-bred birds, as in newly-made breeds, another factor is apt to complicate matters. One cannot always tell whether departure from the normal colour is an expression of individual vitality, or an out-cropping of colour from some particular ancestor of a different colour altogether. But I have never known a poorly coloured bird, pure or crossed, who was a really good layer. Some of the pens in last winter's laying competition might almost have been made to order in support of this statement, notably the silver Wyandottes. One pen consisted of four large handsome birds, very showy, decidedly light in colour and with brilliantly red combs. The other pen presented a great contrast. They were very dark, small and insignoficant at first with no combs noticeable on arrival. But they developed quickly, and proved excellent layers once they made a commencement, while the brilliant beauties, although from one of the best of strains, steadily declined under the trying conditions, and proved to

be no better layers than those of a dull, sooty black.

Among white birds I have always found that those of a rich opaque white were better layers than those whose colour was of a thin bluish tinge. In this fact, I believe, lies the explanation of the good laying of the white Wyandotte, even when bred for show. In this instance the fancier has hit upon a utility point as his ideal, the white colour he aims at being the external sign of those qualities which produce great layers. So long as this remains one of his aims he can scarcely spoil the white Wyandotte. Let us hope his fancy may never soar from opaque creamy white to skim milk blue.

When we come to buff breeds of modern make it more difficult to detect the medium of colour. Without exception, all those that I have met with among Buff Orpingtons and buff Plymouth Rocks who were decidedly light, of a pale sandy tint, have been poor layers. But when the shade is so dark that it becomes another colour, and is not buff, but "red" or cinnamon brown, then we do not find the birds to be the best layers of the brood. But the confusion of colour and names of colour among so-called buffs is so great that it is difficult to judge of what we hear, or even see. We can scarcely tell whether, in these cases, we are looking at density of pigmentation or at a different pigment altogether. I know of Buff Orpingtons which are an object lesson on the point of colour. There are four pullets, who vary in tint from a light sandy colour to a rich rufous shade, and during their first few months laying they produced eggs in exact accordance with their colour. The lightest laid worst, the next in shade laid half as many again, the next exactly double the first, and the fourth laid just an egg of two under four times the number of the first. Many of the pens last year confirmed my own previous notes on the buff breeds; though in my very limited experience I have not been able to detect any marked difference in the colour of moderate to excellent buff Plymouth Rocks.

Of all the external characters to which we ascribe importance in the selection of stock for laying and breeding, I have found this one of intensity of colour the most helpful and most reliable. For in selecting these birds we are choosing those with the greatest ng those with the greatest amount of vitality, hence the strongest constitutions. And I have found here, where the stock has to be the hardiest possible, as Professor Gowell found at the Maine Agricultural Station, that among excellent layers (even the derided "sprinter") "one feature is common to all these hens; they all have strong constitions."

Poultry Hints.

"Breeding right and feeling right" ensures success in poultry raising.

The essentials for profitable production are sound growth and constitutional vigour.

Fresh air in the roosting houses is absolutely essential at all times.

Uniformity in the size and colour of eggs can be best secured by keeping, but a single variety of standard-bred fowls.

A bright red comb is invariably an indication of healthy vigor.

Experience is the first thing necessary to success in poultry keeping.

It is serious mistake to confine turkeys at night in ordinary poultry houses. Provide a roomy, well-ventilated shed for their use.

Pay particular attention to your breeding birds and see that they are housed in proper quarters.

Guard against rats in the chicken coops, or they will cause more damage in a single night than you can repair in a whole season.

Cull drastically as imperfections assert themselves, and weed out all but the "top-notchers."

Breeding for fancy points can be carried to an extreme. Utility features should be kept constantly in view.

A certain amount of food is required to keep fowls alive. An additional measure is necessary to secure a satisfactory egg yield.

Fowls should be kept busy scratching—not to free themselves from vermin, but to find the wherewithal to fill their crops.

Oats and wheat are as good all-round foods as can be given in the way of grain.

Green cabbage leaves are excellent vegetable fodder for poultry.

A single satisfactory breed of fowls is worth more to their owner than a dozen different varieties.

Never neglect the supply of grit. It is doubly important in the case of fowls confined to limited runs.

Sour or mouldy foods should have no place in a successful poultry raiser's programme.

Growing Pekin Ducks.

DUCKS ARE QUICK GROWERS AND EASY TO RAISE.—A PLAN OF FEEDING AND PREPARATION FOR THE MARKET.

By Mrs. A. M. Bush. in The New Zealand Poultry Journal.

It is a remarkable fact that poultrymen do not take the same interest in ducks that their importance deserves, Probably some breeders have had a few ducks in their yards at one time, "just to give them a trial, and without taking into consideration the difference in them to other varieties of poultry, have found them a continual nuisance, as they greedily eat the whole allowance of food from the expectant chickens and dabble in the drinking vessels, so they have to be constantly cleaned and replenished.

With great injustice to the ducks, they have let such an experience as this prejudice them forever against this class of poultry, while if they had begun right and kept each variety by themselves they would have found that the ducks are more easily raised, are not troubled by vermin, grow faster, are ready for market sooner, command a better price per pound and are more easily confined than chickens. After a fair trial they might even give up chickens for market (as the writer has done), keeping the hens principally for incubating ducks eggs and supplying the table with fresh eggs.

A most satisfactory fence is made with one inch mesh wire netting, eighteen inches wide, fastened on pointed sticks two feet long, which are driven in the ground the extra six inches. One roll of the netting. 150 feet long will enclose a place large enough for seventy-five or one hundred ducklings. If possible these runs should be put on an alfalfa or clover field. In a few days the ducks will eat all the green stuff, when the neeting can be rolled up and stretched in a fresh place. This constant changing of their runs keeps their quarters clean, and consequently keeps them healthy, as the only disease that is at all troublesome to ducks here is what is known as abnormal liver. This trouble is caused by filthy quarters, impure water, sour food and lack of grit. Knowing the causes, it is easy to avoid this trouble. Provide shelter from the hot sun.

My plan of feeding is as follows:—When twenty four hours old the ducklings are removed to the brooder and fed on the following mixture, Five parts of bread or cracker crumbs, and one part hard boiled eggs, with a little fine grit added. The eggs fed are the infertile ones tested out at the end of the fifth day and kept in a cool place until they are used. After four or five days their food is a good mixture of bran, oats and corn chop, equal parts, with about five per cent beef scraps with some grit and soft green stuff added. This mixture, with the addition of more meat and all the chopped clover or alfalfa they will eat, is continued until fattening time. It takes about two weeks to fatten ducks, when a great proport on of corn chop is used and very little green stuff. As the birds are apt to lose their appetites when so large a proportion of corn is used, mix in some charcoal and old plaster, pulverized.

— Pure-bred Pekins for Market. —

With such care they should weigh at ten or eleven weeks, ten pounds per pair if they belong to the Pekin variety, woich has proved most profitable in the hands of experienced breeders, being the quickest growing and presenting the most attractive carcass when dressed. Besides their attractiveness for market, which is a merchantable commodity they are delicious in flavour, no finer meat being put upon one's table than a fat duck nicely roasted.

Market ducks are usually scalded before picking. One breeder says that after beheading a fowl, he plunges it in a boiler of hot water, holding it under for about two minutes. The feathers are thus loosened by the water not having penetrated to the skin. Ducks at the ordinary age, picked in this manner, are usually as easily dressed as chickens. The feathers are quite valuable, bringing from 2s to 3s per pound. Being pure white they command a good price and have a ready sale. The breeding ducks may be picked two or three times after the breeding season is over, but only about every six weeks when the feathers are "ripe."

The size of the mature Pekin duck is required by the standard to be eight pounds for the male and seven pounds for the female. Those weights are required for them, but there is no necessity to stop at that. We can with

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO.
ıd MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive
orrespondence and answer questions.
hese replies will, for the most part, be
nt by mail, unless received just prior
date of publication.

PUBLISHING DATE.—On the 25th of
ch month preceding title date.

DISCONTINUANCES.—Responsible sub-
ribers will continue to receive this
urnal until we are notified by letter to
scontinue, when all arrears must be
id.

SUBSCRIPTION.—Posted to any part
Australasia 5/- per year, in advance.
oreign, 6/.

ADDRESS—85, Currie St., Adelaide.
elephone, 1234.

oper care make a quick growing
rain of ducks weigh ten or eleven
unds each and not lose in symmetry.
tting down to actual experience,
have had some of my heaviest speci-
ens score the highest. So it is to
e interest of all breeders to select
eir breeding stock carefully, keeping
ly the heavy, deep breasted and
mpact specimens, also having due
gard for the exhibition require-
nts. Each year if one small flock
kept, buy drakes of another strain
there will be no in breeding.

To those who hatch artificially
rly maturity is particularly desir-
le. In the matter of egg prodction
e Pekin duck is a close rival to the
n, laying from 100 to 150 eggs in
ason, the number of eggs depending
tirely on the food and care given.

Many people have an idea that
cks will only thrive where there is
pond or water course. This has
en found to be erroneous. Dishes
ould be so constructed that the
cklings may drink freely without
tting wet. When they get older we
d wooden buckets very convenient
inking vessels. If there is a pond
brook on the farm, so much better
r the mature stock, as they are thus
le to keep their plumage clean.
e lack of a water course should not
ter any one from entering the ranks
a duck raiser.

When selecting birds for the show
en it is impossible to overhaul
em too carefully.

To obtain stock strong in egg-
roducing tendency, mate healthy,
ying hens to males of similar
lood lines, the progeny of heavy
yers.

Thanks to well laid down sys-
ms of selection, the 300 egg hen
an almost immediate pos-
bility.

Every year the demand for good
oultry is increasing and the pro-
ressive section of the poultry-
aising community is realising bet-
er prices for its stock.

Pigeon Notes.

Pigeon Notes.

By Carrier.

The public outside the pigeon fancy often confuse the carrier with the homer but the fancy know now only too well that the carrier is only a stay at home to be looked at kind of a fellow hence their apparant desire not to tempt me away from home. When asked at a meeting of the S.A.C. and P. to write notes to this paper the idea was, that I should visit the various lofts and describe the birds met with. Carrier is quite prepared to visit when invited to do so, but not having the power of a Health Board he does not care to push in until the invitation comes along. It rather strikes me that having lately heard of so many burglaries pigeon men are loath to have carrier moving around. Still if they are anxious for any notes to appear they must chance a bit and do their part.

Victorian Notes.

(By G.J.M).

We have had our first show—the South Suburban, at the South Melbourne Town Hall. In fancy birds tkere was not a great entry, but the quality was all that could be desired. The Homers were both a big and a strong lot. In Saddlebacks Messrs. Shee and Ingram divided the honours. In Magpie classes there was good competition between Messrs. Clarke, Searle, Courtenay, and Jackson. In Homers the chief winners were Messrs Cole, Mills, Whitehall, and Mack.

I have the schedule of the North Suburban Show to hand. As usual the Brunswick Town Hall has been engaged, but, judging from last year and the boom in Pigeons over here, I do not think that they will be able to get their exhibits into the hall they used last year.

As I have already mentioned in these notes, the Williamstown Club is allowing its Young Bird Cup to be competed for at this fixture. Besides this fact, the Society has put up a goodly list of specials on its account, so the event is likely to be some thing worth going a long way to see. And we must not forget that the newly-formed Fantail Club has put up several prizes and specials—to say nothing of a Rose—bowl for young bitds. On the whole I am looking forward with pleasurable expectation to the show

Birds that keep clean in the wattle when feeding their young are generally all right inside ; but birds that go greasy on the beak and dirty in front must be watcheh, particularly if in addition the plumage loses colour and sheen.

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Home Notes.

A Mother's Responsibility.

"The most important question which concerns the mother is that of the nutrition of children. She must know how to care for and feed her child, not only that it may not die, but that it shall grow and develop properly and reach its maturity with a sound mind in a sound body. The care of the nervous system is second in importance only to that of feeding. If anything is done to improve the nerves of the rising generation, we must begin with the infants. Great harm is habitually done to the delicate and immature brain of the young child by allowing undue excitement and by over-stimulating this organ during this period of rapid growth. Parents must see to it that in this period the child is duly protected, and that its surroundings are quiet and peaceful, so as to allow a natural healthy development. Older children need especial watching during their school life, and particularly as puberty approaches. The importance of a simple life for growing children cannot be over-estimated. The aim should be not to see how much school work a child can do and not break down utterly, or how much indigestible food he may eat without having acute attacks of indigestion, but so to regulate the child's life that he shall reach maturity with a sound body, which shall give him the best chance in the struggle for existence. The mother's duty is to prevent sickness, not to cure it. The great causes which carry off infants and young children are not the acute diseases such as pneumonia, scarlet fever, and diphtheria, but those conditions which lead to the impairment of nutrition to such a degree that even the slightest acute ailment becomes dangerous or even fatal."

The Children's Teeth.

If a child has a dirty face its parents are disturbed and mortified but there are very many parents who view with calm unconcern or else entirely ignore a far worse state of affairs inside the child's mouth. Whether they think anything inside does not matter, or whether they do not notice, I do not know. One sees a pretty child daintily dressed, with tidy hair and clean face. One thinks what an attractive child he is till he smiles; then is exposed to view a double row of foul teeth, the edges perhaps, white, but the rest yellow, brown, or black, according to the stage of neglect.

Why will parents allow such a disfigurement? It is nothing less. Such a set of teeth will spoil the prettiest face, and not only that, but must fill anyone the least sensitive with a feeling of disgust and aversion. If parents are deaf to all that is said and written about the care of the teeth on account of the child's health, let them think of it from the point of view of looks and cleanliness. Of course it is hard for a busy mother to attend to little things like this, but if something must be neglected let it be the faces and hands, rather than the teeth. They will not suffer permanently, but if the teeth are neglected suffering and false teeth will be the result.

The first teeth should be brushed after meals if the child's mouth is to look neat and well cared for Teach them that it is just as disgraceful to have dirty teeth as it is to have dirty face and hands. If the habit is formed early it will be easier to care for the permanent teeth, which begin to come at the age of six. There are cases where there is some organic defect in the teeth, and where no amount of care can save them, but even when things are as bad as that accumulations of food may be removed and the mouth will look a little better. There are many preparations for cleansing the teeth, but white Castile soap and precipitated chalk are cheap and effective, being, besides, the basis of many of the tooth powders.

Doctors and Health.

The general arrangement according to which the physician serves the public is one that is very largely at variance with ordinary common sense and likely to defeat the very object being sought. Ostensibly the medical profession exists for the preservation of the health of the public. In order for this object to be obtained in its fullest measure, disease must be prevented to the very greatest extent possible, and when it does break out it should be given treatment. But the emphasis should be laid—and very, very strongly—upon prevention. If the skill of the physician is to be rewarded by the most desirable results, he must not simply be active in the sick room, but he must devote much of his energy to matters of general sanitation and right living. A large part of our sickness is preventable, if only the skill of our doctors were directed in the right angle. But by our own foolish arrangement of paying the physician only to cure and not to prevent, we make it financially unprofitable for him seriously to undertake the prevention of sickness. To effect health through causing people to live rightly is unprofitable, but to let disease spread and then treat sick folks brings in the dollars. It is to the credit of most doctors that they really do try to prevent the spread of disease; but at the same time anyone can see that the system is wrong. Old customs are hard to change, and we do not expect to see a revolution in this one, but if there is in its consideration a suggestion that may be easily applied it is that our municipalities and provincial governments ought more largely to employ our doctors to do preventive work in the way of giving public

ddresses when epidemics threaten, ı inspecting schools more close-, and in probing into health roblems generally, rather than o cause them to depend for their hole livelihood upon healing, hich in its turn is so largely de-endent upon the spread of disease rought about by ignorance and rong living.—Exchange.

Clothing.

Too much clothing is quite as angerous as too little, but there re many people who, from lack of nowledge, imagine that by wear-g very heavy undergarments they re rendering themselves proof gainst colds and sore throats. he great point to observe is to ress suitably for all weathers, a ing which is very difficult to ac-omplish some seasons, especially hen the temperature is changing very day. Doctors say that any, especially women, catch old owing to neglect of the nkles. How many think nothing f running over to a neighbour's ith the feet shod in just the ippers they happen to be wear-g in the house at the moment. erhaps a pair of rubbers has been ipped on over the slippers to pro-ect them and the soles of the et, but the ankles, what of them?

It would seem that the ankles re very sensitive to any sudden ange from heat to cold, so they ould be kept warm and dry.

A strong healthy person, who is ut every day in all sorts of eather, and takes plenty of exer-se is far less likely to take cold an one who perhaps, owing to -health, goes out seldom and akes little or no exercise, simply ecause the system of the former wing to it being in a healthy con-tion, is proof against the changes the temperature and the exer-se keeps the circulation in good rder.

A quick, brisk walker will re-uire far less clothing than one ho walks slowly.

Children out playing in cold eather should be kept constantly oving as many colds are caught rough their getting over-heated nd then sitting down till cool nd rested.

With regard the throat do not uffle it up too much, neither ex-ose it to all weathers with a iew to hardening it as some eople do.

Keep the throat warm, not hot, by wearing a folded silk handker-chief under the jacket.

Constant colds and sore throat undermine the system, therefore they should be carefully guarded against as "only a cold" has often been the forerunner of some-thing very much more serious, which has left its mark on the patient for months and even years to come.

Clothing the body properly and toning up the system are only pre-ventatives, but having caught a cold or sore throat let us see what can be done to relieve the sufferer.

Do You Know ?

That a little ammonia in the water will help wonderfully with the family washing ?

That creaking hinges should be rubbed with blacklead, soft soap, and a little machine oil ?

That to clean all kinds of straw baskets, mats, etc., you may wash them in salt and water, and wipe them with a clean, dry cloth ?

That when making common boiled starch sprinkle in a little powdered kitchen salt ? This will prent the starch sticking to the iron.

Thzt the collars of dresses, coats, etc., may be cleaned by dissolving one part of common salt in four parts of alcohol, rub-bing it on gently with a small sponge, then wiping off with a dry soft rag ?

That flat irons when new should be heated very slowly or they may crack ? When they have once been tempered in this way any amount of heat will not injure them ?

That you may often get rid of black beetles, cockroaches, etc., by mixing a little sugar with some finely powdered plaster of Paris and sprinkling about the hearth ?

That all bed linen should be thoroughly aired before it is used ?

Tkat sheets should be folded in paires, and kept on a shelf in a dry cupboard or closet ?

That shelves are better than drawers or chests for linen, as they are not so likely to gather damp ?

That you may remove mildew from linen by making a mixture of two parts starch finely powdered, one part common salt, and the juice of one lemon ? Apply with a brush to the spots, and let the article lie on the grass for a couple of days and a night. Then wash in the usual way.

Take Enough Sleep.

"A healthy infant sleeps most of the time during the first few weeks," says the New York "State Medical Journal," "and in the early years people are disposed to let children sleep as they will. But from six or seven years old, when school begins, this sensible policy comes to an end, and sleep is put off persistently through all the years on to manhood and womanhood. At the age of 10 or 11 the rhild is allowed to sleep only eight or nine hours, when its parents should insist on its hav-ing what it absolutely needs, which is 10 or 11 at least. Up to 20 a youth needs nine hours sleep, and an adult should have eight. Insufficient sleep is one of the cry-ing evils of the day. The want of proper rest and normal conditions of the nervous system, and espe-cially the brain, produces a lament-able condition ; deterioration in both body and mind, and exhaus-tion, excitability, and intellectual disorders are gradually taking the place of the love of work, general wellbeing, and the spirit of initia-tive."

Recipes and Hints.

Orange and Lemon Marmalade.—

A lady with a reputation for good housekeeping gives the following recipe for orange and lemon marmalade :—Take 6 sweet oranges and 7 lemons. Pare finely and soak in 5 quarts of water for 12 hours. Boil until the skins are tender ; stand aside until next day, and boil with 12lbs. crystal sugar.

Bread Crust Pudding. — Crusts accumulate in many houses where people have not learned that they are the sweetest and richest part of the loaf. The following is a good recipe for using them :—Soak the pieces of bread and crusts in sufficient milk (skim will do, but new is better) to well cover them. Place all in a large dish in oven, and leave until soft and spongy. Then beat up with a fork, sprinkle with mixed spice, add sugar to taste, a liberal amount af raisins and currants. Beat all together, and place in buttered pie dishes and bake until solid and brown. This is a delicious luncheon pudding, especially cold. An egg or two added will make the pudding richer.

To make good starch take one cup of starch, and let it soak in two cups of cold water for two or three days before required. When wanted for use add one cup of boiling water, in which has been dissolved a small teaspoonful of borax. Take a lump of yellow soap, and rub into the starch untill it lathers well. Starch at once.

Sties on Children's Eyes.—The tiresome little gatherings on children's eye lids called sties may often be checked by persistent bathing with very hot water directly redness and swelling begin to show (taking great care to have no exposure to draughts or cold between bathing). This scatters the inflammation which causes the sty. Zinc ointment will usually check development, but not so safely. A child who is constantly troubled in this way is in weak health, and wants some suitable tonic or medical treatment.

Rhubarb Jelly.—This is best made when the rhubarb is well grown, towards the end of the rhubarb season. Wash the stalks but do not peel, as the pink skin gives an attractive tint to the jelly. Cut the stalks into medium sized bits, never mind stringing them, and to each pound of fruit allow a cupful of water. Stew gently until a perfect pulp. Strain through a cheese cloth bag, and to each pint of juice allow a pound of granulated sugar. Let the juice boil for about 20 minutes, add the sugar, and stir until the sugar is quite dissolved. When the syrup is thick turn into glasses and cover when cold. You have here a very agreeable, pretty jelly, its pale pink tone being unusual and an ornament to any table.

To Destroy Ants.—Half a pound of flour of brimstone and four ounces of potash, placed over the fire in an iron or earthen pan until dissolved and united, then beaten into powder, and a little of it infused in water. Wherever this is sprinkled the ants will die or leave the place.

To Clean Bottles.—Cut a raw potato into small pieces, and put them into the bottle with one tablespoon salt and two tablespoons water. Shake well together until every mark is removed. We know this is a good plan.

To Remove Sunburn.—A little lemon juice put into a cup of milk, and then the face washed with the milk, is a complete remedy for sunburn, provided that it is not too severe.

To Remove Tar from Cloth.—Rub the cloth well with turpentine and every trace of tar will be removed.

To Cure Heartburn.—Eat a small piece of raw carrot ; it will give certain relief. Don't laugh at its simplicity, but try it.

Cement for Bottles and Jars.—One-third yellow beeswax and two-thirds finely powdered resin ; put together into a clean saucepan and set near the fire to melt slowly. When all is melted remove from the fire and stir in finely powdered red brick dust until the mixture becomes the consistency of sealing wax ; then dip the corked jars in twice.

Pickled Cabbage.—Chop the cabbage. In the meanwhile, place on the fire a granite kettle half full of cider vinegar, and add one bag spices, and about one cup sugar to one quart vinegar. Let boil a moment, have chopped cabbage near at hand one side of you, the stone jar on the stove beside the kettle, place a small portion of the cabbage in the kettle, let scald, remove to the jar, and put in fresh cabbage. A long-handled colander dipper is convenient for removing cabbage from kettle to jar, as the vinegar will then drain back into kettle. Fresh vinegar, sweetened and spiced, may be added when necessary. When all is scalded pour the remaining hot vinegar over the cabbage, cover with an earthen plate and add a light weight to keep the cabbage under the vinegar. Try this.

A Catechism.

Is your home beautiful ?

Are the surroundings pretty ?

Are they as good as those of any neighbor ?

Are they as pretty as you could make them ?

If not, why not ?

Putting aside beauty—

Are the rooms as clean and as tidy as those of any of your neighbors.

Are they well ventilated ?

Are they kept well aired ?

Are the nooks and corners, the ledges, and tops of shelves free from accumulations of dust ?

If not, why not ?

Carnation Breeding.

In transferring the pollen, some use a magnifying glass, camel's hair brush and pair of tweezers. I have never used either, until recently when I find it necessary to use eye glasses. I do not believe in the method practiced by some in removing the petals of the flower when half developed, as I think it injurious to the normal development of the other important parts of the flower, so essential to success. My custom is to split the calyx in three or four places, so that the petals can drop down around the stem, thus leaving the pistil, stamens, anthers and stigma fully exposed to light and air. The stamens can in this way be easily removed between the thumb and finger (fore finger) with the anthers and pollen intact, and transmitted as desired.

In using the camel's hair brush for conveying the pollen there is danger of getting it mixed, as it is difficult to clean the brush, before using on a different cross. In crossing, one should always have a definite object in view—an ideal to work up to. Keep in mind the very best of the various types now in existence—also their defects, then go to work with a determination to excel. The first requisite and one to be always kept in mind is a healthy, vigorous constitution, that means disease resisting; next comes color, always indispensable, for no matter if all other points have been obtained and the color is undesirable, the plant is only good for re-crossing, because of its desirable habits, then one must work for the necessary stem and strong calyx to hold the flower erect; size, form, substance and last but not least fragrance, must all be considered—fragrance I regard as indispensable.

— Applying the Pollen. —

One must study the various varieties to be used, and fine judgment is sometimes required to know when the flowers have reached the proper stage for the experiment. In some varieties the pollen is perfectly ripe and ready for use as soon as the flower expands, while in others it does not appear for several days after the bloom develops. On the ends of the stamens are the anthers, which, when they burst, produce the pollen. When ripe it is in the form of a powder. The stigma is the part to which the pollen is applied and as it reaches the proper stage for fertilization the upper surface assumes a rough, hairy appearance. It is now ready for crossing, and upon this surface the pollen should be spread, being careful that it is properly ripe and dry, when it will be seen to adhere easily. If fertilization has taken place, the petals of the flower will wilt and fade within from one to two days, and often in a few hours, which is a sure indication that the operation has been a success.

— Gathering the Seed. —

The seed pods should be picked with four to six inches of stem attached, carefully wrapped in paper, or enclosed in envelopes and allowed to dry thoroughly. This usually requires about two weeks. The seed should then be carefully removed and planted at once.

Flats thoroughly drained with a layer of one to two inches of ashes, over which a like quantity of sifted loam of a light sandy nature has been spread, makes an ideal compost. Level off carefully, press moderately firm, sow in rows one to two inches apart and ½inch deep, which can be made by pressing a narrow strip of wood into the soil, cover carefully with about ½inch soil, water with a fine sprinkler and place upon a shell in a light situation out of the reach of mice, which are extremely fond of carnation seeds—one mouse, if he "gets busy" will destroy hundreds of seeds in a night. This happened to me one season when I had sown the seeds in 4-inch pots, which were placed on a bench, and I had omitted to cover them with a sheet of glass, as was my custom then. I lost almost an entire season's seeds by my neglect in one night, and I confess I did not feel very kindly toward that mouse next morning.

— Care of the Seedlings. —

Great care should be taken to keep the soil moderately moist. If the sun is warm a paper should be spread over the flats during the day, and removed towards evening. This prevents too rapid evaporation. The seed will usually germinate in from four to ten days, when all shading should be removed, and the flats kept in a light airy position free of draughts. It requires good judgment in watering to prevent damping off by excess of moisture, or injury by becoming too dry. When the seedlings have developed their second leaves, they should be transplanted into small pots or flats; I prefer the latter as there is less danger of a check by becoming too dry. They should be kept in a light, airy position to insure a compact growth. Plant out in rows similar to general varieties. Those making a compact, bushy growth should not be stopped back but allowed to bloom, and determine whether it is worthy of a further test. Those inclined to run up with a single stem and no side growths should have the centres pinched out, so as to induce a bushy growth, so valuable later, should the variety prove an acquisition. The idea of encouraging the seedlings to bloom early is to be able to select from the field those worthy of further trial.

Notes on Planting Roses.

The Rose is partial to soil that may be classed as stiff—that is to say, it approaches clay, and is not so loose and powdery as what is called a sandy loam. But very few of us can afford the expense of changing our soil, so the next best thing has to be done to improve it as much as we can, and thus make the best of what Providence has given us.

Dig out the soil for a space of two feet square and place it on one side. The with the fork, or, if necessary the pick, break up a lower layer of soil to a depth of twelve inches. This should give a total depth to the hole of from eighteen inches to two feet. Before returning the soil which was put aside, place in the bottom a shovelful of the most ancient and rottenest manure you can get. Cow and sheep manure are excellent for this purpose, but if you can possibly secure a load of rotten pig manure do not let the chance slip by, for I think that that particular brand of manure is absolutely the best. But pig manure is very difficult to get, and so is sheep, so one has generally to be content with cow or stable. To return, stir and stir again the manure with the soil and then return that which was taken out in the beginning.

I am very fond of mixing with this top layer a proportion of the sifted earth obtained from the compost heap. This is especially useful if you have been in the habit of occasionally watering your compost heap with liquid manure—a very useful custom, and one that materially increases its value. Let not your spirit tire, but prepare every hole carefully, the last as the first, even if you are putting in a hundred—believe me, you will be amply repaid in coming seasons.

In a week's time turn the ground over again with the fork, and in another week's time repeat the operation. Don't be in too great a hurry to plant. Its a good adage, "Hasten slowly," and no more solid advice can be given than to have the soil properly prepared before attempting any planting.

Rose plants must be kept out of the ground as short a time as possible, and until they are planted should be "heeled" in on the south side of a wall or hadge and a wet wheat sack thrown over their foliage. By "heeling in" is meant scooping out a shallow hole in the ground lar enough to contain all the roots, and covering them with three or four inches of soil, which should be watered in so that it will keep the air from the roots.

— Pruning. —

Young as they are and small as some of them will be, they will all require the knife or secateurs applied to them. Attend to the roots first. Cut out all unripened wood and shorten back the main branches to five or six buds, cutting to one pointing outwards. The main branches left should, if possible, be in such positions as to form a symmetrical head when the bush grows. When the top is pruned, attend to the roots. Numbers of these will have been bruised, cut and injured when they were dug out of the nursery, and these without exception should be removed with a straight, clean cut immediately above the injury — that is to say, between the injury to the root and the stem of the plant. See that the cut is made slantways and so that the surface faces downwards.

Have prepared beforehand a kerosine tin containing a mixture of water and earth in such proportions that the earth has been converted into a somewhat watery mud. Into this mud dip the roots of the Rose, thus giving them a coating which will effectively exclude the air from them—a point that will materially help them to take root in their new position. This done, place the Rose in the centre of the hole, and as deep, or perhaps a trifle deeper, say an inch or two, than it was originally.

Arrange each root separately so that it points straight outwards, and is inclined downwards, so that when all are done they resemble the spokes of a wheel. A trowelful of sifted loam, prepared for the purpose beforehand, placed on each root as it is arranged in position, will retain it in its position whilst you are doing the others. This done satisfactorily, return the soil until the hole is half full, then with the foot, press the soil firmly down. As each Rose is planted give it a can of water, but do not fill the rest of the soil in to the hole for quite an hour.

— Herbaceous Perennials. —

There is no doubt that, although annuals (flowers that bloom the first year and then die) give the quickest and gayest return, they entail a great deal of labor and attention more than most men in business can give them. What with the sowing of the seed, its successful raising, pricking it out, transplanting into beds, and then after flowering the clearing up of the old and the replanting of new, the work is everlasting. For the man who has not the time for all this the herbaceous perennial will suit his purpose better.

By herbaceous perennial is meant "plants which produce stems annually from a perennial root." Of this character are the following: — Phlox (perennial), Michaelmas Daisies Cyclamen, Lilies, Polyanthus, Primroses, Solidago, Anemone japonica, Musk Rudbeckia (golden glow), Perennial Sunflowers, Tropoeolum Pentaphyllum, Delphinium, Daisy, Ranunculus, Perennial Gaillardia, Arum Lillies, Aquilegia (Columbines), Asclepias incarnata, Tritoma uvaria grandiflora, and Tuberoses.

From this list a garden may be set out which will last years, the work of the gardener consisting in digging, hoeing, weeding, manuring, and, with some of the plants mentioned, staking and trying. Sometimes it will be found that some of the plants may be spreading too far and taking up

more than its share of the bed. This will apply more especially to the Sunflowers. When this occurs, the gardener has only to raise the offending root, divide it up into smaller portions, replant one, and throw the others on the rubbish heap.

— Propagation by Seed. —

The following may be raised from seed :—Delphinium, Michaelmas Dasies, Lilies, Cyclamen, Ranunculus, Anemone, Musk, Dasies, Polyanthus, Primroses, Perennial Phlox, Gailardias. The seed of the Delphinium may be put in now. Get the best. Don't keep it, plant it as soon as you get it. Its a poor seed to germinate if it is at all old. Sow in boxes and cover an eighth of an inch with sifted stable manure. When seedlings have four leaves, prick out into pots. Transplant during the warmer weather of September in positions in the bed. They bear flowers of every shade of blue, and thrive equally well on the hot Adelaide plains or the cooler temperatures of the hills, south, and south-east. A bed of these seen in full flower will be never forgotten; they are so beautiful.

Polyanthus, Primroses, Ranunculus, Anemone, and Gaillardias are all so easily raised from seed that it will suffice to say that the soil should be well drained and sandy, the seed covered according to their size—that is, the larger the seed the deeper you must cover them, and keep watered, but not sodden.

— Propagation by Division of Root.—

They are all except the Cyclamen Ranunculus, Anemone, increased by the cutting up of the root. This is best done with a strong and sharp pruning knife. Each part must be so cut that it has roots adhering to it. Sometimes it is advisable as with the Polyanthus Primroses, to plant these divided portions into a nursery bed first, and afterwards, when they have gained size and strength, transplant them out.

— Planting. —

The arrangement of the plants is of importance. How ridiculous it is to see, as we very often do, some dwarf growing plant like the Polyanthus or the Violet, planted in the middle of the bed, whilst the edge near the foot path is occupied by some tall-growing thing like the Sunflower. The front of the bed, the part bordering on the path, should be filled with specimens of Polyanthus, Primroses, Cyclamens, Freesias, Hyacinths, Ranunculus, Anemone, Perennial Daisy, behind these will be planted Gallardias, Anemone Japonica, Tuberoses, Perennial Phlox, Aquilegia, and behind these again Delphiniums, Redbeckia, Arum Lillies, Michaelmas Daisies, Sunflowers, and that pretty little creeper, Tropoeolum Pentaphyllum. For this last a post, four or five feet high and having some wire netting wrapped round it, should be provided. It is one of the prettiest little things imaginable, and will quickly cover the post. Later on, when it is covered with its curiously shaped and quaintly coloured flowers, it becomes quite a feature of the garden.

Flowers and Foliage.

"Why Trees Bloom Before They Make Theit Leaves" is the title of an interesting article in the "Christchurch Weekly Press," by "Hortus," and old correspondent of "The Australasian." He says the above is a pertinent question, and deserves a satisfactory answer. Just consider for a moment what flowering means to a plant, and what purpose it serves. The display of flowers which everywhere abounds in spring, both in flower and fruit garden, particularly in the latter, is a manifestation of accumulated energy gathered up during last summer and autumn. During these busy growing months the banking accounts of these plants and trees was being added to and stored up with definite purpose of giving a wealth of bloom in the spring. And what purpose has this wealth of bloom in the plant's economy? Just for that great design in Nature, viz., the perpetuation of the species by the bearing of fruit and seeds from which new plants will arise. We see, then, that the flowers of the present time are but manifestation of works done previously, and the flowering is but a continuance of the whole design. This work, however makes a considerable strain on the plant's energy and for it to take on the production of leaves at the same time would be but to make the strain greater. We at once see the wisdom of putting off the affoliation till after the flowering period of the plant, and the wisdom of Nature in the distribution of energy over a necessary lengthened period. But another important fact is worth noting—should many of these trees and plants have energy enough and to spare, so that the flowering period and the clothing with foiliage could go on at the same time, this would not be advantageous, but would result in much loss of fruit and seed, owing to the fact that many of the flowers would be hidden by the foliage, and so escape the visits of insects and the influence of the zephyrs which carry the pollen, and thus miss pollenation, which is the essential factor in seed and fruit bearing. Speaking generally, it will be noticed that distribution of energy has an important bearing on the question. This will be seen in the case of the evergreen shrubs, which almost in all cases make the growth at one season of the year, and display their flowers at an other. The rhododendron, camellia daphne, health, and Indian azalea are all examples. Among the bulqs, cochicums, nerines, belladonna lilies, etc., all of which are objected to by many people owing to their nakeness in the flowering season, all prove how true the principle is.

Cattleya Citrina.

Cattleya citrina, or "the Tulip Orchard," as it is often called, is quite distinct. Its beautiful lemon, sweet scented, waxy flowers as well as their peculiar habit of growing downward always attract attention. The best place to grow this cattleya in is a cool, airy house, such as one would grow primulas, cinerarias, azaleas and like plants in. In a house of this kind, Cattleya citrina will invariably do well. It can be grown either in small pans or on blocks of wood with a little osmunda fibre attached to the block to which the plant is fastened with copper wire until the roots take hold of the block.

The plants require very little water at any time of the year but enjoy a cool moist atmosphere at all times. An occasional dip in weak liquid manure water will help to build up strong pseudo-bulbs and consequently a good crop of flowers. Most orchids will go back after a few years of cultivation if they do not get the proper care and food and this we can not always give them because we do not know what their particular requirements are; but once in a while we hit upon the right course of treatment for certain species, be it accidental or through experimenting and then the plants will go ahead and grow as well or nearly so as they did in their native home.—Horticulture.

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Rose Pruning.

— Object of Pruning. —

The main object of pruning is to gradually change old and worn-out wood, to direct and regulate a properly balanced supply of sap throughout the plant, and to form a symmetrical head, producing a quantity of fine, well-formed blooms, evenly distributed above the foliage.

— Dwarfs and Own Rooters. —

In order to obtain this end it is necessary to commence on the young plants. In choosing the roses from the nursery, always select healthy, well rooted, clean and up-right growing specimens. Having secured such, the most important step is to cut them back. The removal from the nursery destroys the greater portion of the roots, therefore the top should be reduced accordingly. The grower who neglects to do this, instead of having his young plants pushing out three or four strong shoots, which would produce some good blooms, will only grow a lot of weakly twigs, which will only handicap their future well-doing.

Having the roses thus properly started, I would let them bloom. I hold that these first flowers will not injure the plants at all, provided that they are cut away as soon as they commence to fade and so prevent the formation of seed. The blooms should always be cut back to a healthy "eye," which, in its turn, should produce another flower.

— Suppress Water Shoots. —

Meanwhile, if the roses have been planted in a good position, and particular attention given to draining, trenching, and manuring, some strong shoots from the base should begin to make their appearance. These generally grow fast, and carry a lot of flower buds, which are seldom any good. These shoots are a great strain on the plants, and only those which are necessary to form the future head of the rose should be retained; the others should be taken clean out of their "sockets." By the end of February, when summer pruning takes place, the retained shoots may be cut back to a good "eye." By such treatment those glorious autumn blooms, so dear to rosarians, will be produced.

— Winter Pruning. —

By following the above directions in the principle, even if not to the letter, when the winter overhaul takes place, the operation of pruning will be greatly facilitated and the shock to the roses considerably lessened. The best way to proceed is to select the branches which are to be retained. I think three branches, starting from the base, are preferable to four, and four to five. Care should be taken to select well-ripened shoots, yet not too old and hard. These shoots should be as near as possible evenly distributed around the plant; then cut away all the rest, and shorten the selected shoots by about two-thirds of their length to a healthy "eye," pointing towards a clear space. Sometimes it happens that one of the selected branches not be ripe enough. In such case it is preferable not to cut it until it is properly matured, as I convinced that unripe shoots when cut back only produce weak growth and no flowers.

— Climbing Roses. —

The pruning of climbing roses is a more complicated work. It all depends for what purpose they are to be trained. As a rule, they bear flowers on the shoots of the previous season, which ought to be retained. If the climbers are grown on a wall or fence these shoots should be lightly shortened and neatly tied, fan-like, always placing the strongest horizontally and the weakest vertically. Three canes would be suffic?nt for a young plant, say, two years old. Four, five, or six could be retained as the climbers became older and stronger.

If trained on pillars or arches only, two or three strong canes should be allowed to grow. These would soon break into laterals, which should be cut back more or less at the grower's discretion.

Where plenty of garden room is available climbing roses could be grown as bushes, many varieties being suitable for the purpose. These should be treated as ordinary dwarfs, any strong growth could be shortened at pleasure, so as to keep the bushes symmetrical.

— Pegging Down. —

Perhaps the most fascinating way of growing climbing roses is to peg down the long canes on the lawn. A clever gardener could give them any shape desired. Unfortunately, very few of us have lawns suitable for the purpose.

To obtain extra fine blooms from hybrid perpetuals hard pruning is absolutely indispensable; but teas, hybrid teas, and noisettes should never be pruned too hard, as, from experience, I can safely say that over-pruned tea roses, although producing larger blooms they are apt to be coarse and discolored.

The tools required for pruning are a pair of seccateurs, a thin flexible saw, and a good knife. These tools should be of the highest quality obtainable, and should always be kept sharp and clean. Any large cut should be trimmed

with the knife. This causes the wound to heal quicker, and also prevents canker and other diseases.

The most important work after pruning is to carefully collect and burn all prunings. This destroys all aphis and other pests. A light dressing of lime over the rose beds and a thorough syringing of the roses with strong kerosene emulsion would, at this stage, be exceedingly beneficial.

While careful and judicious pruning is indispensable to produce extra fine blooms, yet rose lovers who do not thoroughly grasp the art of pruning need not become discouraged, because roses growing under favorable conditions, especially teas and other hybrids, always reward rosarians with good cuts.

Culture of Begonia Glorie de Lorraine.

It is comparatively easy to propagate, by taking leaf or top cuttings. By taking batches of cuttings at intervals it enables one to have the fine specimens in 8 and 10-inch pans down to the smaller size of 4 and 5 inch pots. After taking the cuttings insert them into clean, sharp sand in a temperature of 60 to 65, with a bottom heat of 5 to 10 degrees higher, and give them a good watering; afterwards care must be taken not to keep them too wet until they are well rooted, which will take from six to eight weeks, at which time they are ready for first potting into 2 or 2½inch pots, using a compost of one-third loam with a good sprinkling of good sharp sand. Do not pot them firm or there will be a great loss. After potting, place them on a shelf near the glass, partly shaded, in a temperature of 60 to 65 degrees, taking great care not to let them suffer for want of water, and syringe them on all favorable occasions. As they begin to fill their pots with roots, repot them into larger pots, being careful not to overpot them. A good compost is one part flaky leaf mold, two parts loam, with plenty of sharp sand; when spacing give the plants plenty of room, so that they get all the air that's coming to them, for one good specimen plant is worth a dozen poor, weak-looking ones. A sprinkling of soot between the plants at intervals of every three or four weeks is very beneficial; it not only keeps down slugs, insects and spot, but helps to give the foliage that rich, dark lustrous appearance of health. When they begin to make rapid growth and require spacing and repotting into their final pots, use a compost of one part good flaky leaf mold, one part loam, and one part well-rotted cow manure. Now that they are getting quite large they will require a few supports of thin wire, and by using green silkaline they can be tied into attractive shape. A little stimulant will be very beneficial from now on. A little soot dissolved in some manure water is a very good stimulant. Two of the greatest secrets of successful begonia growing are: first, never to overpot them; and second, never to pot them too firm.—"The Garden."

The possibility of successful gardening, mainly through the efforts of enthusiasts, has been very much in evidence during the past few seasons, and the success which has thus far attended them will doubtless prove a strong incentive to others who realise that a few flowers in and around their dwellings make them much more homelike but have not experimented at improving their surroundings in this direction. As the season is favourable as regards rain the present time is a good opportunity for making a beginning and a letter addressed to Mr. W. J. Smith,* of Clifton Nursery, Walkerville, will bring along all the needful information as to the correct time, soils, and method of planting, etc. Mr. Smith is an experienced gardener — having been, "Through the mill" as the saying is — and everything sent from his Nursery is most-to-date and complete and may be absolutely relied on. Orders are already on hand for Orange, Lemon, and other Citrus trees and in order to be able to secure any of the above lines our readers are advised to send for particulars without delay. Included in his many Nursery lines the following specialities may be mentioned:—Palms, Shrubs, Climbers Carnations, Hedge plants, etc. All flowers and shrubs are growing at Mr. Smith's Nursery with really great luxuriance which is typical of the surroundings, the situation being admirably situated for such a purpose. Roses also form an important feature, and just at present Mr. Smith holds a very large stock which consists of many exceedingly beautiful varieties Included in the stock may be mentioned the Cyclamen, of which he has many thousands to choose from. The Pelargonium has been made a speciality, and Mr. Smith has now a very superior show. It may be mentioned incidentally that this business has been established for over 61 years.

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

The Flower Garden.

Summary of Operations for August.

Finish digging all beds as soon as soil will allow, and keep soil open and weeds down thereafter by perpetual hoeing ready for the warmer and dryer weather.

Finish pruning Roses and shrubs. Roses and other shrubs may still be transplanted.

Propagate Penstemons, Verbenas, Pelargoniums (Zonale) by cuttings.

Prepare seed boxes for summer annuals and transplant into beds seedling plants ready in the boxes.

A few early sowings may be made of Asters, Mina lobata, Capsicums (ornamentals), Balsams.

Give liquid manure to Cineraria, Pansies, Stock, and others that are bursting in to flower, or are showing vigorous growth.

Take up Cannas and similar grow-perennials and divide. Manure well where they are replanted.

Keep Daffodils, Hyacinths, etc., clear of weeds, and the ground loose and open with the hoe.

Remove all weeds and rubbish from paths and weeds that would possibly form harbor for slugs snails, and other vermin. Don't be afraid to dust your beds with lime, for, besides killing the slugs, it is great manure.

Pruning.—If Roses and shrubs have not already been pruned, they should be attended to at once, for the quickly rising temperature will cause the sap to flow freely, and when that is so heavy pruning will do harm. In that case it will be preferable to only touch them lightly with the knife by cutting out some of the branches crossing others, and thinning out the centre a little.

Rose trees (standards or bushes), shrubs, and trees may still be planted out. Give them every chance by doing it carefully digging a hole large enough to contain all the roots spread out, firmly pressing the soil on them, watering them when planted, staking to prevent disturbance by wind, and mulching with long manure, which last is rather untidy, but does not get so easily washed away by heavy rain.

Verbenas. — Cuttings of Verbena that were struck in pots or the "open nursery" in the autumn have probably by this time made nice strong healthy plants, and if the beds have been already prepared may be transplanted into them at once. These ground trailers always show up best when placed in beds by themselves. As it is difficult, and often impossible, to give the beds in which they are growing much cultivation during the season, it is most important that the bed be well dug and manured before transplanting takes place, so that if the beds are not ready, keep the young plants in the nursery a little longer, nipping back the points to prevent them getting straggly.

Chrysanthemums.—The work in the Chrysanthemum beds during August will merely consist of keeping down the weeds in the nursery bed to prevent the young plants from being smothered. If the beds to contain the flowering plants for next season have not yet been prepared this should not be delayed any longer.

Penstemons.—Seed of this perennial may be put in now, but boxes exposed to the weather should be protected by glass, as heavy rain is likely to wash away the seed or beat down the tiny seedlings. Cuttings of named sorts, that were rooted earlier, can be placed in their permanent positions. A well-grown plant of Penstemon takes up considerable room, and they should not be planted nearer to each other than two feet.

Few perennials strike more easily or root quicker than the Penstemon, and a few plants of the different varieties should be kept always on hand either to replace misses or mishaps in your own garden, or to supply "the ripe wants of a friend." Make the cuttings of the young tops three inches long, and cut just below a leaf.

Plant Gladioli.—By putting in a few of these bulbs at fortnighly intervals, a succession of bloom is secured for the greater part of the twelve months. Seed of this bulb may also be sown. This will produce flowering bulbs in two years.

Summer Annuals. — The general planting of summer flowering annuals will be due next month, and seed boxes and pans must be got ready this month to receive them. When large quantities of seed are to be sown the cases that galvanised iron is imported are good and remove the sheet of tarred felt which will be found in the bottom of each of them. If it be left in there will be little or no drainage, and attempts to raise seed without it can only end in failure.

When only a little seed is to be raised, the boxes in which the tins of mustard arrive in are very handy. The soil should be a nice sandy loam, which has been run through a fine sieve. Don't mix manure with it, but a little sifted stable manure may be used to cover the seeds with.

Sow the seed in drills three inches apart, as this enables you better to keep the boxes clear of weeds—a consideration that must not be overlooked. Cover the seed according to its size. Some of the very minute seed will barely require any covering at all whilst some of the larger kinds may be covered from an eighth to a quarter of an inch. The old rule, "cover the seed to the depth of its diameter," is a pr.t., safe one to follow.

With regard to the name of the varieties you have planted, don't trust to memory—it very often fails at a critical moment. Some amateurs

I wot of, have a habit of planting the whole packet, and then, by way of a label, they slip the empty paper into a slit stick at the end of the drill. It scarcely need be said that the ink soon becomes unintelligible, and the label useless. A packet of a hundred neat wooden labels only cost a shilling, and are well worth the money. A smear of paint over the surface, and then written on with lead pencil is the most approved style of making.

A calico shade will be needed to place over the boxes during bright days. These should be lightly made, of the width of the box, and half its length, so that two will be needed for each. When the seedling are up the shades should only be on during the hottest part of the day, in the morning and towards evening remove them for if the plants be kept too close they are liable to become leggy and weak.

Water with discretion. "The surface of the soil must not be allowed to get dry," but this does not mean that the soil is to be constantly in a state of puddle. One state is quite as bad as the other.

— Carnations. —

Beds manured with rotten cow or sheep manure and dug so deeply that they are practically trenched, that were, or should have been, prepared weeks ago, may be planted with young plants, a stock of which the careful gardener will always have by him. The old plants—that is, the two-year-olds, need not, and should not be thrown away, for with care they will give an early show of bloom, which, if not up to show standard, will come in extremely useful for house and table decoration. One of the best ways of treating them is to dig them up carefully, breaking as few of the roots as possible, and removing all soil from the roots by dipping them in a bucket of water.

Dig the bed in which they were, and turn in some good food, and then replant them in their original positions, but this time two or three inches deeper than they were before. Neatly stake the long branches and give each a can of water. By this means the soil is renewed, and the Carnation plants will scarcely feel the check at all. They will then give some fair blooms probably some weeks before the younger plants.

— Cannas. —

Like all plants with a similar growth they are abnormal feeders and quickly work out any soil if left too long in one position. Dig them right out and divide up the roots with a spade, leaving two shoots to each portion. Turn in a liberal quantity of good manure, old stable stuff for preference, and then replant. In a large garden, with a supply of water, these grand looking plants make a telling display in groups. Their broad dark green leaves and brilliant flowers show up most effectively during our hottest days, provided they are well supplied with moisture and manure.

— Tuberoses. —

Tuberoses multiply very rapidly, and it becomes neccessary to raise them every second or third year and divide the clumps, or else they get so thick that they destroy each other. The present is the best time to do this, and when the bulbs are out of the bed, dig the ground over deeply and add manure before replanting.

Those who have not already a clump or two of Tuberoses would do well to get one at once. Their cultivation is so simple, they take up such little space, the flowers are so beautiful, and their scent so exquisite that I don't think anyone knowing them would willingly be without one specimen at least in their garden. Fair-sized clumps which may often be divided into five or six smaller portions, can be procured for a shilling or eighteen pence.

Sowing Annuals in the Open.

Practically all garden annuals can be sown and raised in the open with good results, providing a little care is excercised when carrying out the work. In the first place we must determine for what purpose the plants are required, and then plan our operaare required, and then plan ouroperations accordingly. Generally speaking, annuals are used for two purposes, namely, the filling of beds and the filling of blank spaces in borders. Taking the last-named purpose first, it is often convenient to sow the seeds where the plants are to flower, thinning the seedlings as soon as they are large enough to handle. Now the seeds of the majority of annual flowers are small, and to sow them in the open border with only ordinary preparation is, in most cases, a sure road to failure. In the majority of flower borders, especially where the soil is heavy, the ground is none too friable, and the following method should be adopted to ensure success.

Mix up a barrowful of good soil similar to that used for filling seed boxes, two parts good loam and one part sand, with a good sprinkling of leaf-soil if the latter is procurable, forming a good mixture. Pass this through a half-inch meshed sieve. Then with a spade scoop out the original soil of the border where it is desired to sow the annuals to a depth of 2 inches, and fill in the depression thus made with the prepared soil. Make this fairly firm and sow the seeds thinly on the surface, covering them very slightly in the case of tiny seed and deeper in the case of comparatively large ones.

Bordeaux and Burgundy Mixture Lime-Sulphur Spray.

It may seem that the subject of Bordeaux Mixture has been pretty thoroughly considered, but so many questions are constantly sent to experiment stations and publications in regards to its manufacture and use that a discussion may not be out of place, writes "Horticulture."

— Its Discovery. —

In all bulletins and articles published on plant diseases, Bordeaux Mixture plays a very important part in the recommendations for treatment. It was accidentally discovered in France in the little town of Bordeaux, about 1882, by a man named Millardet. He was losing many of his grapes near the road from depredations of passers-by, so to protect them he covered the vines with a coating made of copper sulphate and lime. In the fall there was such a noticeable difference, in amount of mildew, between those treated rows and the rest of the field that he observed it. By further experimenting, the value of Bordeaux Mixture was discovered.

— Its Composition. —

As ordinarily prepared, Bordeaux Mixture is a thick, sluggish, bluish liquid composed of copper sulphate and lime carried in water. The fungicidal value comes from the copper, one-millionth part being often sufficient to destroy plant life. If the copper sulphate (commonly called "bluestone") is dissolved in water it will have the same effect as the mixture, but it has the disadvantage of being quickly washed off the trees, and furthermore, has a tendency to burn the foliage, especially where large drops collect. The lime in the Bordeaux Mixture, on the other hand, forms compounds which act as carriers and retainers, liberating but a little of the copper at a time. As a very small quantity is all that is needed, a good coating will last through several very heavy, prolonged rains. And the lime prevents burning, thus doing away with the second objection.

An amateur parusing technical bulletins dealing with this subject is very likely to become confused over the large number of formulas, different ones often being mentioned for the same purpose.

The 5-5-50 may be considered the basis of them all. This means five pounds of bluestone and five pounds of lime to fifty gallons of water. For different plants and different diseases this is changed to some extent. For instance, dormant trees can stand a heavier dose than those in full leaf. The peach is more liable to suffer from an ordinary formula than the apple or pear, and the susceptibility has to be taken into account. Some men overcome this by adding an excess of lime, others by using less basic material. And so it goes. A carefully made formula may safely vary a little provided there is an equal or excess amount of lime. A weak one carefully made and well applied will give better results than a strong formula hastily put together and carelessly squirted on.

It seems a very easy matter to put copper sulphate and lime together in water, but the actions which take place are very complex, and in fact, not well understood by the chemists. In general, the lime which is calcium hydroxide, has a stronger affinity for copper than the sulphuric acid, and when the two ingredients are

put together calcium copper hydroxide comes down as a soft, light blue precipitate while some of the lime is given up and unites with the acid to form calcium sulphate. But there are a number of minor changes, especially with impure materials. A knowledge of these is not important, only in so much as they show the need of very thorough methods to insure a proper mixture.

— Its Preparation. —

The preparation of the 5-5-50 formula will serve as an illustration. Let us suppose we are to make a hundred gallons of prepared spray. Good lumps of unslaked lime are secured, the best coming from the centre of the barrel. Tens pounds is carefully weighed out (twice the amount called for in the formula, for the hundred gallons), and placed in a bucket or half barrel. It is then carefully slaked by adding water, using only enough to keep the mass dampened, and repeating frequently to prevent burning. When thoroughly slaked the lime should be pasty, a little rubbed between the thumb and finger giving no sensation of grit or coarseness. When this is obtained, a very good Bordeaux can be made. Meanwhile the ten pounds of bluestone should be dissolving. It can be put in the night before if so desired. A quick way is to put the bluestone in a burlap bag and suspend this in a barrel or tub. No metal receptacles will do, for the copper corrodes most of the common kinds. Hot water will also hasten dissolving.

Just previous to using the Bordeaux Mixture, one-half the lime is placed in a barrel and diluted with clean water to twenty-five gallons. One half the bluestone water is also brought up to twenty-five gallons in another barrel. Then by pouring the lime water and bluestone solution simultaneously pail by pail through a sieve into a third barrel a complete Bordeaux 'Mixture will result, which will stay in suspension and give the best results when sprayed on the trees. This scheme is for use when the receptacles are barrels. If the spray tank holds a hundred gallons, all the lime and bluestone can be brought up to fifty gallons each and then drawn directly into the tank. Stock solutions of lime and bluestone may be kept on hand.

— Its Use. —

In spraying, a nozzle which throws a very fine mist is the best such as the Bordeaux and Vermorel. The material should be kept constantly stirred and driven through the pipes with a high, steady pressure.

When arsenicals are used, they may be carried in the Bordeaux Mixture without impairing it. If Paris green is used a slight excess of lime should be put into the original formula.

Benefit in spraying will be in proportion to the care in preparing the material, thoroughness in spraying, and time of application.

— Its Limitations. —

Bordeaux Mixture is a preventive and not a cure. The spores of a disease are carried by water, wind or insects to the plants. When these minute 'seeds" come in contact with moisture they germinate, and, if nothing prevents them, enter the tissues of the plant. When Bordeaux Mixture is present the copper poisons the sprouting germs, causing them to shrivel up and die. Once within the host they are beyond reach, and so the spray must be on before the germs start to grow. However, if infection has started further spraying will prevent damage on uninoculated parts.

While not a panacea for all ills Bordeaux Mixture has a wide range of usefulness, and the grower of a few plants or trees troubled with disease can secure just as good results as the owner of acres.

— Lime Water Bordeaux. —

We have at various times referred to the Woburn method of preparing Bordeaux Mixture, and Mr. Pickering's recommendation that lime water (that is a solution of lime in water) in place of milk of lime (that is a suspension of lime in water) be used in place of the ordinary method. Some year or two ago Mr. Pickering reported satisfactory results in his practice for which he claims simplicity, certainty of result, and economy. The new formula does not appear to have been extensively tried in Australia. One of the most recent references to it, which we have seen, is contained in the January issue of the Agricultural Gazette of N.S.W., in which Mr. W. J. Allen writes :—

"Some experiments have been made at Glen Innes Experimental Farm orchard to ascertain whether Bordeaux Mixture prepared in this way has any practical advantage over the ordinary mixture, but the results have not been definite. The

(Continued on page 108).

Notes on Grafting.

— An Old Practice. —

Grafting is one of the oldest and most important operations in connection with the gardener's art. There are many ways of doing the work, each having some special application, but the principle is everywhere the same. The operation consists in working one variety of fruit tree or other plant on to another variety. It is by no means confined to fruit trees or to hard wooded plants. Plants, like tomatoes or potatoes, can be and are grafted, and so can forest trees, such as oaks, planes, or cedars. Some varieties of plants can only be grown by this method, or by striking cuttings, and the propagator usually selects the easier plan. In some cases grafting is much more effective than striking cuttings, and is generally employed in the propagation of some varieties of plants, such as variegated cedars and so forth, which originated in the first place from sports, so that the subsequent tree is really a portion of the original sporting branch. Sometimes a variegated or peculiar foliaged branch or twig, called a sport, will be found on a given variety of tree, and the gardener, by taking this and grafting it on others trees, perpetuates the sport, and continues to produce it indefinitely.

— The Principle Involved. —

In every case the principle controlling the work of grafting is the same. A portion of one plant is so tied to another that the cut surfaces are placed in close connection, the growing point of the two portions known as the cambium layers, or, in common language, the layers of sap wood next to the bark being placed close to one another, so that when new cells are formed the two parts are united and form one.

— Bud Grafting. —

When only a bud, with its accompanying bit of bark is used as a scion for grafting, the process is known as bud grafting, or simply budding. When a larger portion of a plant is used as a scion the process is known as grafting.

Budding or bud grafting is used chiefly in connection with young wood and young trees, although it is by no means confined to these circumstances. It is used almost entirely in many classes of nursery work, such as in connection with the propagation of roses. Grafting is used more particularly in connection with the re-working of fruit trees and the production of blight proof stocks. It is also the process used in connection with the propagation of variegated cedars and such plants.

It is impossible in the course of a short article to deal with all the methods of grafting, and for the purpose of the "Garden and Field" it is not necessary. Many of the methods are more curious than useful, and others are only useful in special instances.

— The Stock and Scion. —

The tree or plant which is being operated upon is called the stock, the part which is grafted on to the stock is called the scion.

— Application. —

Although grafting is applied to a very great number of plants, it is only particularly successful when used in connection with trees either of the same variety or closely related. Thus apple scions should be grafted on apple trees, although they will take on pears and the hawthorn. Pear scions should be grafted on to pear stocks, except when it is required to obtain dwarf trees, when quince stocks are used. Peaches usually do best on peach stocks, although they will take, and in some cases thrive equally well or better on some other stone fruits, such as the almond or the apricot. The apricot is best grown on the apricot stock, but it will sometimes thrive on plums, almonds, or peaches. Cherries should be worked on special cherry stocks, and so on. Trees or plants of different genera can rarely be grafted; thus you cannot grow apples or pears on stone fruit stocks, and you cannot graft oaks on gum trees, or walnuts on willows.

— Influence of Stock and Scion. —

There is much yet to learn about the relative influence of the stock on the scion and the scion on the stock. Sometimes no apparent influence can be seen at all; for example, the ordinary varieties of apples do not appear to be influenced by the kind of apple stock upon which they are grafted. Thus, we might take six scions from one apple tree and graft them on six different trees, and get apples which possess the true character of their variety, and cannot be distinguished one from the other. But on one stock we might get a distinct variation. The scion of an ordinary apple, say the Jonathan, grafted on to a Paradise stock, will produce Jonathan apples of the ordinary type, but the tree will be dwarfed. Using quince stock for pears dwarfs the resulting trees, but in most instances does not apparently produce any difference in the character of the fruit. All varieties of pears, however, will not thrive on quince stocks, neither will all varieties of apples do on the Paradise stock.

Grafting may be done at any season of the year, but there are certain times which are particularly favorable for certain kinds of grafting. For example, bud grafting is best done when the sap is moving freely, whereas the ordinary grafting of deciduous trees is best done when the sap is just rising. Speaking generally, when a piece of wood is used for the graft, it is best applied to the stock in a dormant condition in the spring, just before the growing period. This applies not only to appears, pears, peaches, plums, and such deciduous trees, but also to oranges, lemons, olives, the carob, and so forth.

In every orchard there are trees which produce fruit of comparatively little value. If such trees are vigorous and healthy, it is desirable to rework them with scions from productive, valueable sorts.

To do so chop the top of the tree off about 18in. or 2ft. from the ground, then make a clean cut with the saw 9in. or a foot from the ground. The object of chopping the top off first is to prevent the trunk from splitting where it is intended to insert the grafts. Of course, if care be ex-

ercised the tree can be taken down in one operation; but it is important that the surface where the grafts are to be inserted should be uninjured. With a pruning knife, draw knife, or spokeshave, smooth off the top of the stock where you intend to put the grafts, and space, so that there shall be a graft not more than 3in. apart all round.

The method of cutting the bark of the stock is to make a vertical slit down the bark for an inch or an inch and a half, so that the bark on each side can be lifted.

The scion, which should of course have been secured while the parent tree was dormant, is cut either with a shoulder, or with a slanting cut, which is much quicker, answers the purpose admirably, and always makes a good union.

One or two eyes or buds are left on each scion. If two the upper bud will point inwards, and will grow strongest, and it should be pinched off when it has reached a few inches in length, and must be kept pinched to force the growth into the lower bud, which grows outwards, and, therefore, tends to form an open centred tree. If this is not done, it is preferable to have only one bud on the graft, and have that bud point outever. In having two buds, however, two growing points are provided for each scion, and the chances of failure are proportionately lessened.

The bark of the stock being lifted, the scion can be easily pushed down into place, so that the whole cut surface of the scion fits closely against the sap wood of the stock. As the scion is frequently as thick as a lead penc l, it will naturally lift up the edges of the bark of the stock. The operator then takes a sharp knife and quickly and neatly trims off the edge of the bark, so that it will fit close to the scion.

Having inserted all the scions and fitted the bark, they are all tied tightly in with a piece of binder twine or similar bandage. Tie as tightly as possible, in order to keep the scions close to the stock, and to prevent the bark from lifting and forming cavities.

When the grafts are in position and have been bandaged, a good coat of grafting wax is applied to the whole cut surface, and down the side of each slit, in order to keep out the air. Inserted in this way, and treated as described, there should not be 5 per cent, of failure of scions. Although a new tree can be formed from one shoot, any one who knows how difficult it is to get the bark to heal over the wound will realise the importance of having as many healing points at regular intervals as possible. At the point of insertion of each graft, new tissue is formed, and the healing process goes on perfectly regularly all the way round the stock, however thick it may be. Whereas if one scion dies out, there is a weak place there, and the healing is uneven. It is a wise precaution to shade the north side of the stock.

When the grafts have taken, shoots which are not wanted to produce permanent branches should be stopped back 3ins. from the stock, and kept stopped. As long as there are several leaves on them, the healing of the wound will go on, and the main strength will go into the permanent branches.

Goldfinches and other nesting birds are very destructive to most binding materials. Raffia is found to be the best naterial to circumvent their wicked designs.

(Continued from page 105).

tests have been made against apple mildew—a foliage fungus, and it has been very difficult to say whether either of the mixtures has been beneficial. The orchardist, Mr. W. Le Gay Bereton, suggests that experiments be carried out in a locality where apple black spot is prevalent, as results can then be measured by counting the fruit.

In the first trial, the lime water was made by slaking 3 lbs. of fresh lime in a little water, and stirring it well into 120 gallons of water. This was allowed to settle until the water was quite clear. Such a method would require almost all the lime to entirely dissolve in order to give a saturated solution. It was found that 86 gallons of the lime water would not neutralise all the copper sulphate (6lbs. 6½ozs. dissolved in 3 gallons of water). Mr. F. B. Guthrie, chemist of the Department, recommended that the lime water be made as is done for medicinal purposes, by allowing a good excess of lime to stand in contact with water. Put 2ozs. of slacked lime into a stoppered (or corked) bottle, containing 1 gallon of water (rain water for preference); shake well for two or three minutes, and allow to stand for 12 hours. The excess of lime will have settled out, leaving a saturated solution of lime water, which may be poured or syphoned off as required.

When the experiments were repeated this year, check blocks were treated with ordinary Bordeaux mixture in two different strengths, 6-5-40 and 5-5-50 respectively. The difference between the results from Pickering Bordeaux mixture and the other mixtures used were so slight and inconsistent in checking powdery mildew on apple trees that it is impossible to draw any definite conclusions. In some cases the results were slightly in favour of Pickering's mixture, in others slightly in favour of ordinary Bordeaux mixture."

— Bordeaux Paste. —

For amateurs and growers of few trees only, there is little doubt that Bordeaux Paste, which is Standard Bordeaux in concentrated form, is a means of saving both time and trouble. Mr. Quinn has reported favourably on its use at the Blackwood Experimental Orchards. As far as our own experience goes we have found Bickford's Bordeaux Paste quite effective in checking curl leaf in peaches, and other diseases such as Shothole and Rust in stone fruit.

— Burgundy Mixture. —

Burgundy Mixture has never been as popular a remedy as the Bordeaux. It may, however, be used as a substitute with full confidence, it is more easily prepared, and there is less liability to error than in the use of lime. The method of making Burgundy, or the Copper Soda Spray, as it is sometimes called, is to dissolve 8 lbs. washing soda in 25 gallons water, 6lbs. bluestone in 25 gallons water, and mix the two solutions together. The mixture is then ready for use.

— Lime Sulphur. —

In America the lime sulphur spray is becoming very popular as a cure for curl leaf, and other fungus deseases. We notice that Mr. Allen the N. S. W. Fruit Expect, is also recommanding its use. Originally lime sulphur was considered to be useful principally as an insecticide.

Concentrated Lime-Sulphur.

The making of the lime sulphur is a somewhat tedious process, and this has led to the manufacture of a concentrated form, which is being very largely used, even by large growers in the U.S.A. This preparation was not obtainable, we believe, until quite recently when Messrs. E. & W. Hackett informed us that they had made arrangements to accept the agency for one of the most largely used brands. To anyone who may for any reason have been dissatisfied with results from Bordeaux, we should recommend a trial of this new preparation.

Orchard Notes for August

Finish planting and pruning deciduous trees.

Graft apple stocks, and prepare to graft other trees as the sap rises.

Cut and preserve scions from trees which have been proved to be healthy growers and prolific croppers.

The best time to graft is when the sap of the stock has commenced to rise, so that the bark separates readily. If the scion be dormant it usually takes under such conditions.

Cultivation.—If the orchard was not ploughed in early winter, it should be done before the weeds get too high to beproperly buried. The surface should then be worked smooth, and the weeds kept down by cultivation.

Codlin Moth.—The trunks of trees, and all harbor, should be carefully cleaned, and the scrapings burnt. Good and early cultivation up to the stem of the tree will be a help in destroying any stray grubs.

Worthless Varieties of Fruit. — Of course, I do not mean absolutely worthless, for the very worst is good pigs' food, but many varieties are quite unprofitable to grow for market, and are, therefore, from a commercial point of view, worthless. Yet they take space and require as much labor as the best sorts, especially in the gathering. All such trees should be pruned with an axe, and if the stocks are good, be grafted or budded to good sorts. If the stocks are not good, the pickaxe must be used, and the tree dug out to make room for something better.

ighting of Country Towns.

AN INEXPENSIVE ILLUMINANT.
INSTALLATION AT DRYSDALE.

Extract from "The Age."

Drysdale, Tuesday.

(By our special reporter.)

After having served this little town-hip faithfully, if not well, for over) years, the kerosene lamp has been anished, as far as the lighting of he streets is concerned. In the place f the old time glimmer, the main horoughfare is now aglow with the atest development in illuminating gencies—"air gas." This light, al-hough comparatively little known in his part of the warld, is in great ogue on the Continent. So far it as been installed in about 150 towns. n several of them its use is now so eneral that over ten miles of pipes ave been laid. Its popularity is ow rapidly spreading to many towns n England.

Drysdale enjoys the distinction of eing the first town in the Common-ealth to use the gas as its lighting edium, and the experiment has been decided success. The new process ives a steady and brilliant white ght, and its illuminating power ppears to be just as high at the oint farthest from which it is gener-ted. This station, it may be re-arked, is merely a small shed in hich the machinery is enclosed, with djoining tower 37 feet in height. he gas is a uniform mixture of air nd petrol vapour. The percentage f petrol vapour, however, is very mall, air being the chief constituent. he odour is not disagreeable and he gas is claimed to be non-explosive. he production is carried out in an utomatic and self-contained machine, riven be weights which requires no ttention beyond keeping it clean inding up the weights and filling ith petrol, a duty which occupies a ew minutes only each day. The eneration is affected by means of ertain quantities of petrol becoming aporised in a chamber of air partly nder pressure. In this chamber, or arburetter, is a four-cylinder pump orking in a receptacle partly filled ith water. Air is introduced through he suction chamber of the pump, and s the petrol enters drop by drop as is instantly formed. A special eature of the apparatus is that the ump is so arranged that an even emperature is always maintained, so hat freezing due to evaporation is ntirely obviated. By means of the utomatic feeder the amount of petrol ntroduced into the carburetter is al-ays in exact proportion to the mount of air, which depends on the mount of gas being used, so that a niform mixture is always produced n sufficient quantity to feed the umber of lights in use, the machine orking quickly when the gas con-umption is large, and slowing down s less gas is consumed, or stopping ltogether when no gas is required. he action is continuous and auto-matic, so that the quality of the gas never varies.

Naturally, the chief point of interest to the residents of the township and others similarly situated is that of cost. The installation was completed about a fortnight ago, but it was not till to-night that anything in the nature of an official ceremony was held. To mark the occasion, at the invitation of Messrs. Philips and Pike, agents for the Aerogen Gas Machine Co. Pty Ltd., representatives of the Geelong City Council and the Colac, Bellarine and Winchelsea shires made an inspection of the plant and the light. The engineer in charge reported that during the past fourteen days twelve 70-candle power lights had been burned for 5½ hours each night on a consumption of 8 gallons of petrol.

The value was 13/4. An examination had, he said, been made of the pipes, and the gas had proved to be absolutely non-condensing. All of those present were unanimous regarding the value of the light to small towns unable to afford the more expensive installation of an electric plant.

The company responsible for the introduction into the Commonwealth of this new mode of street illumination claims that, with petrol at 1/6 per gallon, a 40-candle power lamp can be burned for one hour at the small cost of one-tenth of a penny. It contends that to give the same amount of light coal gas would cost one-sixth of a penny, kerosene 0¼d.; acetylene gas, with carbide at 2d. per lb., 0¼d.; and electric light, at 6d. per unit, three-tenths of a penny. Citizens of Melbourne will perhaps better appreciate the comparison when it is stated that the cost per thousand feet amounts to only 3/9, compared with the extortionate amount of 5/- which they are compelled to pay.

After the inspection the visitors adjourned to Cooney's Buck's Head Hotel, where a number of toasts were honoured. Cr. W. Gray (acting President of the Bellarine Shire) presided. Crs. R. Williams (Mayor of Geelong), J. Cairns, Daffey and Harvey, congratulated the Bellarine Shire on its forward movement, and on the improvement that had been effected in the lighting in the town.

Mr. L. Bridge in responding to the toast of "The Aerogen Gas Company," said that it was the intention of the Shire to shortly supply householders. The company was making arrangements to light towns in New South Wales and other States.

Melbourne, 29/1/12.

Agents for South Australia—Charles Atkins & Co., Ltd., Currie Street, Adelaide.

Propagating English Walnuts.

There is no better way of increasing the English Walnut than by sowing the nuts. Kept moist from the time of collecting them until spring they are fairly sure to grow, and they soon make good growth and in damp deep soil the seedlings make a long tap root, but it is claimed, and looks reasonable, that in light soil there is much less tap root and more fibrous ones, and this is said to be true of all nut tree seedlings. It is worth trying, as the lack of fibres is what makes the transplanting of these seedlings so difficult. The thin shelled and other varietal forms of the English Walnut cannot be relied on to come quite true when grown from nuts, and grafting has to be done to increase them. The common English is used for stocks, although it is claimed that the black Walnut makes a good stock for them. The grafting is done by scraping the soil from around the stocks and grafting them well into the crown of the plants. This would be a good time to make a trial of it, as with scions cut now and held back a week or two, it would find the sap rising in the stocks. — "New York Florists' Exchange."

Use of Explosives in Fruit Growing.

By Kenneth B. Quinar, General Manager, Cape Explosives Works, in The Agricultural Journal of South Africa.

In one of your late issues a correspondent askes for information regarding the use of explosives for ditching, etc. As the subject is naturally one which greatly interests me, I offer the following observations in the hope that they may afford your correspondent some information, or at least prove of passing interest to some of your readers. In fact I shall use his letter as an excuse to bring before the farming public a way of increasing the profit of their farms by the use of explosives.

Few people realize the variety of ways in which dynamite can be made to serve the farmer. Unfortunately farmers in this country, even more so than lay persons, give to dynamite of every description a very wide berth. In America, on the other hand, dynamite is regarded as the farmer's best friend, and the demand for dynamite for agricultural purposes has grown in the past few year's from practically nil to many millions of pounds; indeed, at the present time, it is thought that this market for explosives will shortly be of more importance than is the mining industry.

Explosives are now used by the up-to-date farmer for tree planting, sub-soiling, ditching, stumping (removing old tree stumps), boulder blasting, road making, and for a thousand and one other purposes which space will not permit me here to enumerate. The three first-mentioned uses are those most likely to prove of interest to South African farmers, and to these I will confine my remarks.

— Tree Planting. —

Our South African orchards and vineyards are planted in a great variety of soils, from the deep alluvial of the kloofs and valleys to the shallow (surface) soil of the hillsides. The former are usually more or less permeable to water, and are easily penetrated by the plant rootlets in their search for food. The latter are, on the other hand, usually underlaid by a hardpan, or if not a true hardpan, by a subsoil which is very compact, hard, and difficult of penetration by the plant rootlets. A tree planted in the deep alluvial will establish itself in time and develop to normal proportions, even when planted in the inadequate hand-dug hole usual even amongst progressive farmers. But a tree planted in soil underlaid by hardpan cannot so develop, as the rootlets are unable to penetrate the compacted subsoil. Such trees rarely, if ever, have anything approaching a tap root, and are confined to the thin layer of surface soil for their food supply—a supply often only too rapidly exhausted.

In many cases the subsoil is rich in plant food, i.e., potash, phosphorous, lime, etc., but as the water is the vehicle or carrier of these essentials to the plant, and it cannot penetrate compacted subsoils or hardpans, these storehouses of plant food are not available to the trees, and the farmer is obliged to provide food in the share of fertilizers—truly a case of "carrying coals to Newcastle."

Agricultural experimenters in the United States have shown that it is frequently the case, in soils underlaid with hardpan, that the surface or tilled layer upon which the tree depends for food will contain only 0.05 per cent. and 0.7 per cent. of phosphorus and potash respectively, whereas 3 or 4 feet below the surface the subsoil contains 0.15 and 1.2 per cent. respectively.

Now to turn to the role played by dynamite in scientific tree culture.

A hole, 4 or 5 feet deep and, say, 1¼ or 1¾ inches in diameter is punched or drilled on the exact spot to be occupied by the tree. At the bottom of this hole is placed a cartridge of suitable dynamite provided with the usual detonator and fuse, when the hole is carefully filled with moist earth and tamped with a wooden rod.

Upon exploding the cartridge of dynamite the surface of the earth is seen to rise a few inches and subside; then, after several minutes have elapsed, fine wisps of smoke may be seen rising from many small cracks radiating from the original hole. If now the ground, loosened by the explosion, is removed with a shovel it will be found that a "pot hole" has formed at the point where the cartridge lay, and upon closely examining the walls of this "pot hole" it will be seen that numberless fissures extend far back into the surrounding subsoil, while above the "pot hole" the ground is quite disintegrated, even in the most refractory cases.

In this hole the tree is planted in the usual manner, and the beneficial effects of the blast quickly become naticeable, for experience has shown that trees planted in this way are, after two years' growth, practically double the size of those planted in the ordinary way in spade-dug holes. The reason for this is not far to seek; it is only necessary to dig up a tree planted in hardpan, according to each of the two systems, when it will be noticed that in the case of the tree planted in the hole prepared by dynamite the roots are not only very much more numerous, but longer and more vigorous than in the case of the tree planted in the ordinary hand-dug hole. In other words, the roots are free to spread in all directions, not only through the surface soil but also through the subsoil which has been thoroughly fissured, and which is rich in plant food. Or to view the effect of the blast from another point; it becomes possible for water to permeate the soil and bring into solution the constituents necessary for plant life, thus rendering them readily accessible to the roots. Last, but not least, there is the point that a larger reservoir for moisture is formed right under each tree, by reason of which "dyna...ited" trees promise to be practically drought-resisting; the rainfall, however slight, will be taken up by the soil instead of running to waste.

The extraordinary feature of this method of preparing the ground for tree planting is that after the blast it would be quite impossible to tell from the surface of the soil that so important a change of condition had taken place.

This method of soil treatment seems advantageous for practically all soils and for practically all types of trees and plants. Very great increases in productivity have been observed to follow this treatment. Apple trees which had ceased to bear as a result of age and impoverished soil were

made to yield fine crops by exploding, say, 7 or 8 feet below them, a single stick of a certain explosive. Bearing orchards are often treated with advantage, especially in cases of exceptionally refractory hardpan.

Apply the same reasoning to the vine problem. Obviously, the better the soil the better the crop. Under present average conditions the farmer delves his ground before planting his sticks, if he be progressive, or contents himself with simple ploughing, if he be conservative, and to this latter class, unfortunately, belong the great majority. If the sail has been delved it will be opened to a depth of, say, 18 inches, or at most 24 inches, and if ploughed to a depth of, say, 9 inches, or possibly 12 inches. Soil treated with dynamite, however, is opened to a depth of 3 feet 6 inches to 4 feet, and that at less cost per acre for delving to half the depth. To punch a hole 4 feet 6 inches to 5 feet deep will take two farm boys ten minutes all told; to load and fire it perhaps a further five minutes will be required, and it is estimated that the total cost per acre treated will be between £2 10/- and £5, depending upon the nature of the soil and the number of trees to be planted per acre.

This being the case, it is in my opinion a sine qua non that existing vineyards—especially those on hillsides underlaid by hardpan —will benefit enormously by dynamite ploughing. My idea would be to punch holes in the centres of the rows, say, 6 feet or more apart, and, say, 3 feet 6 inches to 4 feet deep, and in these would be exploded a small quantity of certain dynamite. This would have the effect of fissuring the hardpan and allowing the vine roots access to fresh food supplies, and this without losing a season or injuring a vine.

For lasting good, low initial cost of treatment, and enduring nature of improvement effected, dynamite ploughing will take the lead in Africa as it has in America.

Before leaving the subject of tree planting for the moment it will be well to mention that it has been found that in places where fruit trees have been killed by cut worms and fungus in the soil, and these dead trees have been taken out and dynamite used to prepare holes for fresh trees, the new trees have not been troubled in any way by the fungus, the explosion of the dynamite having rid the soil of the pests.

— Sub-Soiling for Cereals, Forage, Etc. —

Where large tracts of land are to be treated for the culture of cereals, etc., the procedure is the same, excepting that the holes are not so close together. Holes from 15 to 25 feet centres, depending upon conditions, are the rule for this type of work, and it is claimed that very great increases in yield of oats and forage follow treatment of the soil in this fashion. It has been arranged to conduct experiments this winter.

The attention of lucerne growers is especially invited to the foregoing, for it is believed that this treatment will rejuvenate a lucerne patch which has become compacted and hard, and on which the yield shows signs of falling off, and this without interfering with the growing crop. The quantity which it is necessary to explode in order thoroughly to disintegrate the subsoil under the lucerne is so small that not a plant should be disturbed, nor should a pebble or lump of earth be thrown a foot by the explosion.

The Jerusalem Artichoke.

Though this is an excellent and easily-grown vegetable, yet, strange to say, it is only cultivated to a very limited extent in the Australian States. It is a very handy plant and may be cultivated successfully in any fairly good soil in all excepting the most arid regions. It thrives, however, to the greatest perfection in moderately rich, sandy loam, with a moderately amount of moisture. Though the favorable conditions for cultivating this vegetable exist in most gardens, yet in many it is never seen. It is true it may be obtained in the principal vegetable markets, but in limited quantities, and at prices that only few can offord to give. As compared with the potato, the Jerusalem artichoke yields about double the quantity of nutritive matter. In fact, its value as a food is equal to the cereal grains. Another advantage possessed by this vegetable is that it is more easily digested and not so liable to cause flatulency as the potato, and consequently may be eaten safely by delicate persons. Independent of its value as a vegetable, the Jerusalem artichoke is an excellent and profitable crop for feeding swine, which thrive remarkably well upon the tubers. When grown for this purpose, when the crop is mature and the pigs are ready for fattening turn them in and let them root up the tubers. Not the least recommendation is the prolificness of this plant when growing under ordinary favorable conditions.—Exchange.

Brussels Sprouts.

The first condition of success with Brussels sprouts like that of early all other vegetables is the right soil. The best soil is a rather sandy loam, not less than 12 inches deep, the subsoil under which should be sandy or gravel. A clay or stiff sub-soil is uncongenial, and, unless drained artificially or naturally by sandy or gravel sub-soil, success is impossible. The best manure is half stable and cow mixed together, and always bear in mind that the more thoroughly rotten and disintegrated manure can be had, the better will be the result.

After planting, it is needless to say that the soil should be kept continually stirred around the roots, and all weeds kept down. During very dry weather they should get plenty o water.

...

We have received from the publishers (New South Wales Bookstall Co., Sydney) a copy of their valuable publication, "Australian Bungalow and Cottage Home Designs."

The booklet deals principally with the modern bungalow and cottage home, which are becoming very popular throughout Australia. The drawings have been prepared by Mr. Reginald A. Prevost, who possesses a very enviable reputation as an architect in the eastern States. Altogether there are about 78 designs and ground plans for the prospective builder to choose from, each design having a short descriptive note, together with the approximate cost of same, ranging from the very modest sum of £250 up to £1,250. That the bungalow has come to stay is proved by she large number of such houses that have been erected within the last year or so in the various States, and the enterprising firm that have just produced the work under review, thereby giving the individual builder an opportunity of securing a house of his own must be commended for their enterprise, and we have no doubt but that they will experience a ready sale for their well got-up publication.

Vegetable Notes for August.

In the early districts no time should be lost in getting out the tomatoes, of course, protecting them ; and fresh sowings should be made of seeds in the hot bed. The following is a summary of seasonable operations :—

Artichoke, Globe.—It is not too late even in early districts to plant out suckers, and in late districts any time this month will do.

Jerusalem Artichokes. — Plant at once in very early districts, any time in August will do for the Adelaide plains, and September is early enough for the hills. Work the land deeply, manure well with stable manure, adding 1 lb. sulphate of potash and 4 lb. superphosphates to the rod. Top-dress with sulphate of ammonia when the plants are growing. They need moisture.

Asparagus. — Keep old beds clean, and the surface loose and mulched. If not done, apply 2 lb. sulphate potash 4 lb. superhosphate to the rod, and fork it in. To make new beds, thoroughly prepare the land add plenty of manure. Plant two-year-old plants in rows 18 inches apart, and from one foot to 18 inches in the rows. Seed beds may be sown for plants to be set out two years hence, but it is usually best to buy the plants.

Beans. — It is late now for broad beans in early districts, but not in hills.

In early localities it is well to begin to make successive sowings of dwarf French beans at intervals of a fortnigh. This is one of the most useful kitchen garden crops, and one which can be grown almost everywhere. In the warmer, sandy places if sown now early crops will be obtained without water, and wherever water is available, by making successive sowings, a supply can be kept up until May.

Beet.—Thin out and hoe previously sown beds, and if desired make fresh sowings of red and silver beet. It is an excellent plan to have a bed of white beet, for it will grow all through the summer with water, and apart from its use as a vegetable, it is about the best green stuff to give fowls in the summer.

Broccoli.—Set out pants if ir has not been already done. In favorable localities a sowing of seed should be made.

Cape Gooseberry. — Sow seed in warm beds under glass the same as tomatoes.

Capsicums — Sow the same as tomatoes.

Carrot. — I find that carrots and parsnips will do very well in many localities on the plains if sown now and given a little water as the ground gets ''dryer. Sow in rows 18 in. apart, and thin out as required. In the hills sow liberally at the end of the month.

Cauliflower.—Sow seed beds in the hills. It is too late to attempt to grow this crop on the plains.

Celery.—Sow seed beds in the hills and earth up, and water plants as required on the plains.

Chicory.—Sow in the hills. Light, deep, sandy soil is necessary for good crops.

Cucumber. — Those planted in hot beds last month must be carefully attended to and kept growing. Make successive sowings in the hot beds. In favarable early localities sowiags may be attempted in the open at the end of the month, especially if a hole, say 2 ft. across and a foot deep, be dug and nearly filled with fresh stable manure. Cover with 4 in. of light soil, and plant the seeds. Put in pegs 6 in. high all round and throw a bag over until the seeds commence to come up, and every night after until the weather gets warmer. It is, of course, still better to make a few frames of flooring board or palings the size of the bed, and strtch calico over the top. These are put on at nights in cold weather and taken off in warm weather.

Endive.—Tie up those ready for blanching, and in the hills make sowings of seed.

Kohl-Rabi.—This is a turnip-rooted cabbage, and may be sown now in eeed beds in the cooler districts. It is late for the plains.

Leek.—Plant out in trenches similar to celery.

Lettuce, Cress, Mustard, and other salad plants should be sown successively.

Melons.—What was said of cucumbers will equally apply to this crop. It is questionable whether it really pays to try and get plants up early. If, however, it be done, it is important that such care be taken that the plants do not receive a check.

Onions.—Seed beds for the main crop in the color districts may be sown at once. Beds may still be planted out on the plains, especially where water is available.

Parsley. — This is best sown in edgings. Seed may be put in now.

Peas.—Spring crops may be sown now of quick-growing sorts. It is however, late for warm localities. Make good sowings in the cooler districts, and keep on at intervals of a fortnight.

Potatoes.—Good plantings may be made at once, and if the seed be well sprouted and the soil good, the crop will be ready in November.

The Cultivation and Marketing of the Orange.

Extracts from "Notes on the Orange in California, by R. A. Davis, Government Horticulturist (Transvaal), in South African Agricultural Journal.

These notes were collected from personal observation as far as all particulars with regard to actual culture of the citrus family and its general ommercial handling are concerned. Information re co-operative marketing, was kindly supplied by various officials, or by Mr. Harold Powell, secretary of the Citrus Protection League. They have a direct bearing on the budding citrus industry of South Africa in that, although actual orchard practice such as one finds in our best tended groves is little behind that which exists in California, we may learn a very great deal by studying their methods of handling the crop from the moment it is gathered from the tree. It is here that we are in the greatest need of help.

To begin at the beginning, one finds that oranges are budded (and not grafted, under any circumstances) on either sweet or sour stocks, the latter being more generally in demand. Bitter Seville is the favourite, but, in addition, Florida sour and rough lemon are used. Neither of these is as susceptible to gum diseases as is the sweet orange stock, and it is somewhat surprising to find that quite a large number of trees worked on this root are produced and sold annually. There exists a belief that certain soils are better suited to sweet stocks, and that in such soils gum disease will not appear. This does not seem to be borne out by facts, for the writer saw hundreds of seedling trees and others grafted on sweet stocks in the last stage of gum disease.

The growing of the trees in the nursery is conducted on the most careful lines. Each tree is staked and trained to a single stem only. From the time the young buds have a few leaves until the tree is about three feet high and the time for heading back comes, the appearance of each new leaf is the occasion for a raffia ligature; thus a young nursery tree appears to be bound to the stake every couple of inches. Such works calls for a very large amount of labour, and during the growing periods it is customary to see a number of youths and men busily engaged at this work. A good Washington Navel tree sells as 3/-, whilst extra fine ones fetch 4/- and 5/- each. They are almost in every case sent out from the nurseries "balled," that is, with a ball of earth round the roots. The system requires the trees to be planted a little further apart in the rows than usual, but is found quite satisfactory. Trees removed with care, set in a shady place and watered, scarcely wilt; they will travel well for long distances, and as the ball of earth, tied up in sacking to keep it a compact mass, weighs much less than a paraffin tin full of soil does, this method is suggested to our nurserymen for trial.

— Planting. —

Orange trees sent out in this way may be planted without removal of the sack; with the addition of the water which is indispensable at planting time the canvas soon rots. It was noticeable that shallow planting has many adherents, and there is no doubt but that citrus trees of all kinds are more satisfactory and less liable to gum disease when set out in this way. The bud should be at least 6in. above the level of the ground after it is set.

— Training. —

Systems differ just as much in California as they do in South Africa with regard to the training of young orange trees. Some orchards were seen where the old system of allowing the branches to sweep the ground is still adhered; various reasons were given for permitting this with which most readers are familiar, but the main factor in allowing a young tree to grow up in this way proved to be that larger returns were secured in the earlier stages of growth. Thus a four-year-old tree is expected to yield a box of oranges, whilst under the system of trimming the limbs higher and keeping them off the ground, less fruit would be secured. In many cases the lower limbs had been allowed to come down until the tree was six or seven years old, but after that age they had been removed and the tree encouraged to assume the correct shape, that is, well branched and perfectly balanced, with the lowest outside limbs trimmed so that no leaves come within 18in. of the ground. It is a question whether it pays to get every possible penny of income out of a tree by encouraging heavy bearing in its youth, but there are undoubtedly occasions where immediate income appears of paramount importance, and this will probably always be so.

— Pruning. —

Many groves appear to have had very little done, and, indeed, the orange does not require so much attention in this direction as most trees. The practice generally observed is to clean out all small dead wood in the inside of the tree, together with all suckers or water sprouts with any branches which may appear superfluous.

Fruiting in the interior of the tree is encouraged, and to accomplish this it is necessary that branches should be fewer than formerly when the idea prevailed that an orange tree should present a dense wall of foliage from top to bottom.

Most of the pruning is done from inside the tree; that is, the workman does not stand outside as in ordinary pruning, but ensconces himself amongst the branches where, in the case of

large trees, he is completely hidden, and effects the necessary thinning, etc. In some instances the prunings are allowed to accumulate under the trees for two or three years before they are removed, but this only happens where the branches of the trees sweep the ground and so hide the unsightly heaps, which can do no good and only serve as a breeding place for insects.

— Soils and Climate. —

In very few instances did the writer see anything as good for orange culture as are to be found in South Africa. The rich, deep, red loams which abound here are comparatively few and hard to find. On the other hand many thousands of trees are planted and thriving in grey loam of varying depth. Occasionally one finds an excess of lime has injured the trees—an occurrence not likely to happen in South Africa. Naturally, the orchards cling to the foothills on account of the warmth secured. In favoured districts, such as Lindsay and Porterville, there is a tendency to plant lower down in the valleys. Although in many orange-growing portions of the State summer temperature is exceedingly high and the sun so fierce as sometimes to injure the oranges, in winter there is scarcely any portion of the country where pineapples and bananas can be grown commercially on account of the low night temperature prevailing. Thus in some districts preparations are made well in advance of winter for raising the temperature in the groves by means of fires and so saving a crop. It is hardly necessary to point out that this is quite a costly proceeding, and it should emphasize the necessity of planting only on a site which is free or nearly so from frost. Rainfall takes place during the winter months and may be, in the southern citrus belt, anything under 18 inches, very rarely over, and occasionally less than 10. This renders irrigation a necessity, and the provisions for it are very complete. Water is obtained, generally speaking, either from a furrow owned by an irrigation canal company, which disposes of water at so much per acre per annum, or by means of pumping.

In those districts which have no water furrow, of course the pump is resorted to, and in most cases all groves of twenty acres and over have their own pumping station. Bore holes are put down, generally of eight inches in diameter, and a powerful pump installed; those in use are nearly all plunger pumps, the centrifugal being almost entirely replaced by them. Electric power is obtained from some one of the many power companies at a moderate cost. It will be seen how comparatively simple the water question is as compared with our own.

An excellent system of irrigation is in vogue at Lindsay, where pumping is general. The water is pumped up into a small wood or cement reservoir fixed some 6ft. above the highest level of the ground. From there it is conducted by gravitation through a cement pipe-line placed some 15in. under the surface. These pipes vary from 12 to 18in. in diameter, according to requirements. Between every alternate row of trees a smaller cement pipe connects vertically with the large one below ground, and the water is admitted into this by a valve easily turned by hand. In these vertical pipes are four holes, each 1in. in diameter, and through these the water is allowed to start on its beneficial career.

This is almost as perfect a system for the delivery of water as can be devised—it admits of exact measurement, and either slow or quick flow as required. It is distributed amongst the trees by either what is known as the furrow or the check system, the former being mostly used. Furrows are made mostly by the addition of a furrowing attachment to a cultivator frame, and a "furrower" was secured for use at one of the experimental stations, where it will also demonstrate its suitability for the purpose to farmers and other visitors.

The natural sequence to irrigation is cultivation, and here the mode adopted was most perfect.

As soon as a team could get on the land, the sloping-toothed harrow was called into use; this made a good job of the levelling, although there is an implement which does better work, having been specially designed for the purpose. In order to defer the next irrigation as long as possible, the cultivator is then employed. Evaporation, however, is extremely rapid, owing to the intense heat of the sun, consequently irrigation is resorted to more frequently than is generally the case here. Cutaway harrows are generally favoured.

— Fertilizing. —

Cover crops of some kind of legume, principally beans, are in general use in order to afford a supply of humus and nitrogen. The latter is also applied in the form of nitrate of soda and dried blood—the former of these has largely displaced sulphate of ammonia as a source of nitrogen. It acts quickly, whereas the dried blood gets more slowly to work. The sulphate of potash is almost exclusively resorted to for a supply of this material, whilst steamed bones are favoured as yielding phosphoric acid and a certain amount of nitrogen also.

Experiments are being conducted at the University of California, Southern Experimental Station, for the purpose of deciding what

fertilizers are best suited to Californian soils, but as the latter vary as much as our own, it is apparent that no one formula can be laid down as being par excellence the correct thing to use.

It is customary with the majority of growers to use a large supply of fertilizer annually, as much as £15 to £20 per acre being freely spent; it is therefore a matter of the first importance that no mistake be made in the application of any one ingredient which may be unnecessary, and it will be seen that a properly balanced formula is of the utmost importance.

It must be conceded that California fruitgrowers conduct their operations on strictly business lines, so that the expenditure named must be justified by results before it would be so regularly undertaken. That this is undoubtedly the case is borne out by the prices obtained for both unimproved land and bearing groves. Near Lindsay, land suitable for orange growing is worth and realizes from £80 to £110 per acre; there are no facilities for watering, and boring must be resorted to.

Just previous to the writer's visit, the following transactions took place. One orchard of Washington Navel oranges, six years old, sold for £320 per acre; one of eight years for £400, and a little 5-acre plot of Thompson's Improved Navel, 6 years old, fetched £240 per acre.

Varieties of oranges planted now are almost entirely confined to Washington Navel or Valencia Late. Occasionally one finds other types of Navel, such as Thompson's Improved or Navelencia, but the original Navel is par excellence the one to plant. A good many old seedling groves are still found dotted about the country, but the fruit from these realizes comparatively low prices as against the varieties named.

During August a few packing houses were still running on Valencia Lates, and a good many orchards were seen where the fruit was still hanging. As this month corresponds with February here, it will be seen that this was exceedingly late, and the trees were none the better for their long-sustained burden. The fruit, too, had not the juice or flavour which it possessed earlier in the season. However, prices were high, and as long as they hold, there will be no difficulty in finding growers to pick late even should their trees suffer.

— Insect Pests and Diseases. —

California can boast of even more insect pests affecting the orange than South Africa. It possesses all the species present here and others besides. During the writer's visit a campaign was being waged against the Orange Thrip, which has done much damage recently. It attacks both young, tender foliage and fruit The U.S. Agricultural Department had detailed an entomologist to deal specially with this pest, and under him was working one of the students sent by the Transvaal Government to Cornell University. As previously stated, gum disease is extremely prevalent.

(To be Continued).

Dental Surgery is one of the professions in which there is no standing still, and it is gratifying to know that Australian dentists are second to none the world over as regards the adoption of the very latest methods. Britten's Registered Dentistry, 20 Currie Street Adelaide, go further than this, as not only are the Surgeries thoroughly up-to-date, but the proprietors have adopted the liberal plan of easy weekly payments. This, it must be readily understood, often proves a great convenience to clients, and the offer is, we understand, being largely availed of. All kinds of dental work is carried out at the surgeries, and it should be noted that the rooms are open daily from 9 to 5. 30; Saturdays, 9 to 1 and 7 to 9 p.m.—The location it may be added, is directly opposite the Savings Bank, and the proprietors wish it to be clearly understood that this is the only address.

The Farm

Bacon Curing on the Farm.

By R. J. Terry, Poultry and Pig Expert of Tasmania, writes on the above subject as follows :—

A safe cure for farmers curing hams or shoulders of bacon for home use is as follows : —Two ounces of finely-pulverised saltpetre are well rubbed over each flitch, especially care being taken to apply a larger quantity to the parts whence the ham and the shoulder have been removed. The flitches are then placed during 10 or 12 hours upon the salting board, and a mixture of 7lbs. of salt and 2lbs. of coarse moist sugar is heated in a frying pan, and so stirred as to attain a uniform temperature. The flitches are rubbed all over with this mixture in as hot a state as the hand can bear it. They are then placed the one upon the other in a salting pan or trough, when the brine immediately begins to form. They are well basted and rubbed with the brine and turned twice a week ; the under flitch being placed uppermost at every turning, and at the end of four weeks they are hung up to dry. The two hams are cured simultaneously with the flitches. Each ham, like each flitch is well rubbed with 2ozs. of finely-pulverised saltpetre. It is then placed during 10 or 12 hours in a separate dish, with rind or back part downward. It is next rubbed with a hot mixture of salt and sugar, in the same manner as the flitches, with the simple difference that only 4lbs. of salt are mixed with the 2lbs. of sugar for the hams. It is next put into a salting pan to make its own brine, is rubbed and basted with the brine, and turned every day for five weeks, and is then hung up to dry. Note—the sugar used should be coarse brown.

— Brine Curing. —

More or less makeshift appliances can be used in dry salting, but in brine curing, tanks, or at least one tank, is necessary; two or three are more convenient if much pork is to be cured. The tanks may be made of wood, cement, or brick cemented over ; the two latter materials are best. One correspondent wanted size of tanks. My advice is err on the large size. Roughly, a tank, say, 2ft. 4ins. by 1ft. 3ins. by 16ins. will be sufficient for one pig ; 4ft. 4ins. by 2ft. 3ins. by 18 or 19ins. is a useful size for the farmer salting two pigs. If the tanks are of wood, thoroughly soak to make watertight, then scrub clean. If the weather is cool and the keeping of the meat quite safe I prefer that the bulk of saltpetre be used on the meat previous to being put in brine.

— Making the Brine. —

This may vary somewhat to meet individual or customers' tastes as to the quantity of sugar used, or if spices are to be added ; if the latter, they must be in a muslin bag, not loose. I do not recommend use of spices for bacon. 2lbs. of salt to every gallon of water is right ; but salt varies in quality, and the brine should be tested by it being just strong enough to float a fresh egg or potato. To every gallon of the liquor add 3½ to 4lbs. of soft brown sugar, 2ozs. sal prunella, and 2ozs. saltpetre ; reduce quantity of two latter if saltpetre has been used prior to placing meat in brine. The pickle should be boiled and skimmed, then allowed to cool. Then mix sufficient salt with about one-twentieth of its weight of saltpetre. A thin layer is sprinkled on the bottom of the tank, the hams first rubbed well with the mixture, and then packed with flesh side upwards. Plenty of the mixture is packed on top, especially about the exposed bone. The sides and flitches are similarly treated and packed in layers with flesh side upwards, except that the top lay is reversed. The sides and corners of the tank may be filled with pieces of pork. Keep layers as even as possible. Place boards on top and weight or batten down. Fill tank to above level of meat with cool brine. The meat should be either turned or replaced in the other tank every two days. The time the meat should remain in the tanks of course varies with the weight of the pigs being cured, but for farmers' cure about 10 days would be safe.

— Washing. —

Too little attention is paid to washing and trimming the sides previous to drying and smoking. The side should not be just rinsed

in water, but placed in hot water (say, in which one can comfortably bear one's hands), and brushed all over with a brush, removing all slime, loose pieces of fat, salt, etc. The cured meat should then be soaked in clean cold water for a day and night. There will not be any ugly crust of white slime and salt (as is so often seen at some country shows in this State) on the bacon treated in this manner. Retrim if the bacon is for sale, and hang up to dry.

— Drying. —

Dry the hams and sides in a slight current of air if possible (not a wind). If this is not practicable hang in a well-ventilated room or building. Under very favourable conditions the bacon may be fit for smoking in five days, but the probability is it will take much longer. The factory has a great advantage over the farmer in this respect, having fans and heating arrangements.

— Smoking. —

How the farmer smokes his bacon and hams will depend to a great extent on how he is situated. One can hardly expect him to build a smokehouse for curing one or two pigs each year. A large case or barrel may be utilised in those circumstances. But the farmer who sells his products should have a smokehouse, which need not be elaborate: A hut 8 or 9 feet square, composed of rough timber, with stout beams to hang the bacon on. The roof can be almost flat, with a very small opening to let the smoke out; a slide would be an improvement. Cover the floor with 6 or 7 inches of hardwood sawdust, and light at both ends; it will smoulder, but not burst into flame, if the door is kept shut. The period of smoking is a matter of taste. Do not overdo it.

— Conclusions. —

I have tried to make the above directions simple, and to deal with the subject from a farmer's point of view. If the directions are well and faithfully followed, and the feeding of the pigs has been correct, I can assure readers a really good article will be the result. Factory curing is a somewhat different matter. The principal feature of curing is the machinery. There must be a full complement of mechanical appliances, and the principal of these is the refrigerating machine, upon which the temperatures in the chill-room and cellars absolutely depend. A constant temperature is what is wanted, and constant curing conditions can only be obtained by the construction of suitable rooms, the atmosphere of which is under the control of mechanical refrigeration. The reason of this is that the public taste nowadays is for mild-cured meats, and it is quite impossible to cure meat in a mild way except in a constantly cooled atmosphere. The mild-cured meat may not be acceptable to all, but it is certainly more nutritious than meat which is heavily salted. The heavier the salting, and the longer meat remains in salt, the less nutritious it becomes. Therefore, cure at the factory if possible.

Tree-Planting on the Farm.

From the Agricultural Gazette of Tasmania.

The season for sowing seeds or planting young trees for shade and shelter is close to hand. It is a very great pity that so little knowledge is abroad in this respect. Like most works of permanent beauty and utility it is only a close study which enables their virtues to be perceived. Apart from the discomfort and the general toll levied by wind and frost upon stock and crop, the unsightliness of a bare homestead can only be perceived when the owner is educated in sylvan beauties and the graceful habits of growth of the different varieties of trees. If this borders on the sentimental, the saving of both stock and crop from properly-planted shelter belts and wind breaks does certainly not do so, and the aggregated, unnoticed losses from a lack of this provision throughout the State rises to gigantic proportions.

If what were urged involved the farmer in considerable expenditure then the stand taken up could be objected to with good reason; but when it is grasped that thousands of seedlings can be raised on a plot of ground 40 square feet in area, and only a little exertion is needed, with one's neighbours' permission to gather seed, the apathy is lamentable, and a standing charge not only against the farmer's lack of taste, but worse still, his banking account.

To procure seeds from such trees as the pine family all that is necessary is to wrench off the brown cones from trees of a fair age and then immerse the same in hot water for two minutes. The heat will release the bracts, and if the cones are placed in the sun or a warm place for a few days the seeds will drop out on giving the cones a tap on the table or

floor. A good many of the seeds in each cone contain no kernel, and are, of course, useless for germinating purposes. The empty shells can easily be distinguished by their whitish-grey colour, whereas the good seeds are dark in colour. It is a good plan before sowing, to save time and vexation, to crack a few of the seeds until one with a kernel is found. Trees grown on dry banks are frequently precocious, and produce cones at an early age, but it by no means follows that the seeds are anything but empty shells.

Having procured the seed the next move is to prepare the plot of ground for its reception. The site of the plot should be in a sheltered place, where the soil will not get baked on the surface. The ground should be prepared similarly to that for any ordinary garden seeds, and the sowing can take the form of dibbling the seeds in or they can be scattered broadcast and a little soil thrown over afterwards.

If the sowing is done in August germination should have occurred, and the seeds through the ground by September. The only thing now to do for a while is to watch that any weeds that come through are removed and the seedlin s allowed the sole occupancy of the plot.

A wonderful difference in the rate of growth will now be observed in the different varieties of trees. Amongst the pine family the Remarkable, or Monterey Pine will race away, so much so that in the autumn it will be big enough to plant out permanently. The practice of wrenching the young plants is found useful in ensuring a successful growth after transplanting. This is a process of inserting the spade down a few inches from the trees and sufficiently, at right angles, to cut the tap roots, or bearing sufficiently on the spade handle to move the soil and break the root. The youngsters take this treatment sulkily sometimes, and look sickly for a few days, but vigorous seedlings soon make fibrous roots, which allow of their being transplanted with success.

Another method of securing fibrous roots and ensuring transplanting at a distance from seed plot is "mossing." A few weeks after wrenching the seedlings are dug up and the plants handled singly, but by no means must the sun or wind get at the rootlets, even for a few minutes, otherwise disaster will follow. As many plants as can be handled fairly quickly are dug up and conveyed to a shelter shed. Each plant in turn is handled, and the tap root and any other rootlets doubled back and a handful of damp moss is wrapped round and the bunch tied with string or strip of New Zealand hemp. When a few dozen have been dealt with in this way a furrow is made outside in the ground, and the "mossed" trees placed side by side in a row. The soil is then turned back on to the "mossed" roots, and well patted down with the spade. The soil moisture will penetrate the moss, and in a few weeks it will be a mass of fibrous roots. When ready for transhipment the soil is spaded away and the mossed trees just as they are can be packed in a box and sent any distance. On receipt at their destination the trees are planted where they are to permanently remain without in any way touching the moss. If the soil has been properly prepared where they are to grow the young rootlets will soon penetrate the moss and search for food supplies in the soil.

"Puddling," as it is called, is another method of ensuring against loss on transplanting from the seed bed. We will suppose a farmer has grown a few hundred seedlings for placing out on his own farm. If the seedlings were dug up and carried round in a parcel for even a few minutes there is danger of loss through the roots drying out. To guard against this, as soon as the trees are dug from the nursery they are immersed in a bucket of water which contains enough soil in it to make it the consistency of cream.

Transplanting from the nursery can be thus carried on with safety by means of the bucket with the puddled water. The soil particles adhering when a seedling is removed from the bucket and placed in the ground hold moisture, and no doubt yield a modicum of sustenance until the young roots adapt themselves to their new environment.

The sowing of seeds can be done in boxes, which some may prefer. The removal of the box with the seedlings should a change of residence be necessary is, of course, eminently satisfactory. All that is necessary is to see that the box has good drainage, and it may be necessary to give the seedlings a sprinkling of water during dry spells, but this must be done with some judgment. It is by no means desirable to keep the soil saturated with moisture, otherwise "damping off" will occur, which is a fungus trouble caused by excess of moisture.

As a guide to the depth at which to sow seeds it is a safe plan never to plant them deeper than their own diameter. If the young plumule or future stem does not reach the light before the store of food provided naturally in the seed is exhausted the plant dies.

As to what varieties to select to grow will depend upon a number of circumstances. The question of ornament or utility and the amount of space at the disposal of the owner will be the deciding factors.

Home Remedies for Live Stock.

By Thomas H. Dale, M.R.C.V.S., Government Veterinary Officer, in Agricultural Journal of South Africa.

The average farmer is often laughed at by the " superior person " or those more fortunately placed for the, what appears to them, extraordinary remedies which are often pressed into service when any of the live stock of the farm fall sick, but serious consideration of the question will force the individual to wonder what he would do in similar circumstances, the nearest store probably ten miles away and the nearest chemist nearer fifty. There is also the fact that for generations the farmer has had to fall back on his own resources, retaining with almost sacred reverence the lore bequeathed to him by his sires, and making the pantry or the cart shed his dispensary. One can see him at his wits end what to do; how he he casts his eye around until it alights on coffee or cart grease, vinegar or sheep dip, and he remembers that his grandfather once cured an ox of gall-sickness with a mixture of these, so the different ingredients are duly measured out, mixed, well shaken, and poured down the throat of the unwilling beast, one dose usually being considered sufficient, my effperience tells me that it often is, and the expectant hearts of the attendant Kaffirs are thereby gladdened, and a " meat h[illegible] which was fast developing is assuaged, the farmer expressing his conviction that it is a new form of gall-sickness, quite different to what his father had to deal with, and then the slight commotion thus raised subsides, dies out, and there is nothing left to tell the tale, but a sun-dried hide which will some day be made into reims. Still there are many remedies of the home, which if properly used and with discretion may often be pressed into service, and it is proposed to enumerate a few of these, to give their actions and uses, and include any hints which practical experience may dictate.

—Dop, Whisky, Brandy, and Cape Wines. —

Now although it is unusual to find any of these displayed on the sideboard of most farm houses, it is generally found that on emergency a little, especially of the first or last, may be unearthed, and on occasion a better stimulant cannot be found. There are many times when a horse has been overdriven, or " driven over his water " so called, he stands dejectedly in his stall with a cold sweat, quickening breathing, and possibly trembling all over, a quarter of a bottle of " dop " or similar spirit with the rest of the bottle filled up with warm water, well shaken, and given by the mouth, will often stimulate the animal to look for food within twenty minutes, when a nice hot bran mash will complete the cure, and he will be all right in the morning, a serious illness having possibly been averted. Beer or stout may be given as it is, or warmed in a saucepan with a little powdered ginger added, but spirits of any kind must be diluted with three times their bulk of water or milk, for it must be remembered that a horse hasn't got a tin throat. The above remarks apply equally to cattle where a stimulant is required. When a cow has a difficult calving, assistance, although well meant, was probably roughly rendered, and after the birth the cow is unable to rise, a good stimulant given every four hours will often be all that is required, and within the twenty-four hours she will be milking freely and feeding well; in other words, whenever a general stimulant is required no harm will be done, and much good may accrue if any of the spirits named are given in the doses indicated.

— Turpentine. —

Turpentine is probably found in every farm house, and is used indiscriminately for every disease and condition under the sun, consequently the results achieved are varied, and this explains why it is condemned by some and extolled by others, but if used where its special action is indicated it is most useful and can be depended on. For killing worms and other internal parasites it is one of the most useful home remedies that can be applied, and in cases of colic in horses and hoven in cattle it is a very reliable remedy, and in conjunction with other home remedies which are usually found on the farm will usually effect a cure in a very short time. One of the commonest " worries " of the farmer is worms in calves, and in these cases the administration of turpentine (mixed with raw linseed oil or milk) in doses of a tablespoonful and a teaspoonful for lambs and kids generally produces the desired effect, but not always; some cases are most intractable, but in these we can forforsake our household dispensary and obtain from the chemist some extract of male shield fern, which can be administered in doses of 1 drachm with half a dose of turpentine and the usual a...ount of linseed oil, this mixture invariably producing the desired result. In colic in horses or hoven in cattle it is recommended that 2 ounces of turpentine and 1 pint of raw linseed oil be put into a whisky bottle, well shaken until thoroughly mixed, and then the bottle

filled up with dop, whisky, or other spirit, again well shaken, and carefully bottled down the animal by the mouth. This usually gives relief, but if it does not within an hour, a third of a bottle of whisky, dop, or other spirit filled up with warm water may be administered, or if kept in the house, 2 ounces of chlorodyne may be given diluted in a bottle of cold water. Should there be no raw linseed oil in the house it will be found that turpentine mixes well with milk, and although this is not so good, as the oil has a laxative effect on the bowel which the milk has not, it is a means of administering the turpentine which will not mix with water.

— Linseed Oil. —

As will have been already seen under "Turpentine," linseed oil is of very great service and general use, but when using this for animals care must be taken that it is the raw oil which is used and not the "boiled" oil which is used for paints and varnishes, as this in its preparation has lost its active principle and is apt to produce the opposite effect to that expected. Linseed oil has many uses; in small doses it is very feeding. Like cod-liver oil, butter, lard, and fats of all sorts, it can be used as a vehicle far the administration of the more potent drugs, and in large doses is a very valuable purgative that can be depended on and has not the violent properties of croton oil and other drastic purges which often gripe, and unless given with some carminative may cause colicky pains and much distress. For delicate and light fleshed animals 1 ounce in a bran mash twice a day will often work wonders and bring them into a sleek and healthy condition which is often permanent. But it is as a purgative that it is so valuable in this country where aloes is so often unreliable. One pint usually ensures profuse purgation in horses. For cattle epsom salts are better, but if these are not available two pints of oil may be given, shaken up with the same quantity of treacle, gruel, milk, or spirits and water, but there is no doubt that epsom salts is the very best purgative for cattle, and ought to be a household remedy on every farm if already not so. Although castor oil is better for calves, sheep, and pigs, linseed oil can be given in the following doeses:—Calves from 4 to 10 ounces, according to age; sheep and pigs 6 to 10 ounces; dogs may be given 1 to 2 ounces, according to size.

— Castor Oil. —

Castor oil has very much the same action as raw linseed oil, but for calves, sheep, and pigs is preferable. Both foals and calves soon after birth often experience difficulty in passing anything. There is no drug which has a better effect than castor oil, and if enemas of warm soap and water are given the little animal will receive relief in a very short time. Sheep and pigs can be given 2 to 4 ounces, according to age and size.

— Salad Oil and Sweet Oil. —

Should there be no linseed or castor oil in the house, either of the above may be used and will be found a fair substitute.

Lard may be used as a substitute for lanoline, vaseline, etc., in making ointments such as sulphur ointment, zinc ointment, and tar ointment.

— Paraffin. —

Paraffin is found in every homestead, which is probably the reason it is more used than any other remedy; and although all sorts of virtues are claimed for it its medicinal properties are not very marked, and it is very questionable whether it is of much assistance in combating the numerous diseases and conditions to which it is applied, and as it has an irritant effect on the digestive tract it should not be given to horses or cattle in larger doses than 1 ounce. Externally, however, it can be used with advantage to cure mange in horses and cattle and to kill lice, a convenient mixture being made as follows:—Rub up some soap in hot water until it is all dissolved, then stir in an equal quantity of linseed oil, and when this is well mixed add gradually an equal quantity of paraffin (that is equal quantities of paraffin, linseed oil, and soap water). Rub this well into the skin, especially into the mane and tail, on three days in succession. Leave this on for a week, and then wash off with warm water and soap. A cure is generally effected, but if not quite cured repeat the process.

— Sulphur. —

Sulphur is found on most farms, and amongst other things is used for dusting vines to destroy rust and fungi and to make lime and sulphur dip for the cure of scab in sheep. But it can also be used internally with advantage in many cases and externally as an ointment. Many unthrifty animals are benefited by giving small doses of sulphur for ten days or a fortnight in their food, this especially applying to unthrifty pigs. The doses are:—Horses, ½ ounce; cattle, 1 ounce; sheep and pigs, 1 to 2 drachms; dogs, 30 to 60 grains. Should it be found to be necessary to bottle it down an animal, it will dissolve in milk or it can be given suspended in gruel; it will not dissolve in water. Rock sulphur is commonly seen in drinking water supplied to dogs, but as it is insoluble the dog does not get any of it and therefore derives no benefit, but he will usually readily take it dissolved in milk. The flowers of sulphur are often used in mixtures for the cure of mange in horses, mixed with any bland oil, fat, or lard—either alone or with paraffin added. Mange in dogs can often be cured with simple sulphur ointment.

One part of sulphur with four parts of lard, well mixed and rubbed in after the animal has been well washed with soap and water, to remove the scales and scabs.

— Chlorodyne. —

Chlorodyne is a remedy much used in the home for many of the ills that human flesh is heir to, and it can equally well be used for the animals on the farm. In cases of colic in horses 2 ounces can be given in a bottle of water half an hour after turpentine and linseed oil have been given if relief has not been obtained, but chlorodyne does not remove the cause of the colic, it only relieves the pain; it is therefore necessary to give oil to clear out the offending material whatever it may be. Chlorodyne can always be given where great pain is evidenced, but care must be taken not to repeat the dose at too close an interval.

— Epsom Salts. —

Epsom Salts should be to hand on every farm, it is a very valuable laxative for all stock and a long way the best for cattle. Roughly, the dose may be said to be 1 ounce for every month of the animal's age up to 1lb., but large oxen and bulls may require up to 1½lbs. Sheep take 3 to 6 ounces, according to size. In every case all the salt must be dissolved in water, and if available it is best dissolved in warm water. If sdfficient epsom salts cannot be obtained half the quantity may be given and the other half of the dose made up with common salt, which some maintain acts better than the epsom salts alone.

— Other Remedies. —

Horses suffering from biliary fever may be given 2 ounces of epsom salts in their drinking water twice a day with advantage, the medicine reducing the fever and keeping the bowels in nice order without purging the animal.

Common Salt may be used if epsom salts are not to hand, but the dose should be slightly less; ¾ to 1lb. being sufficient for a full-grown beast.

Carbonate and Bicarbonate of Soda are often of use in cases of indigestion and flatulence or hoven, especially in calves which are often relieved by 1 or 2 drachms of bicarbonate of soda dissolved in each meal if they are being fed by hand. Doses: Horses and cattle take 2 to 3 ounces, sheep and pigs 30 grains to 2 drachms.

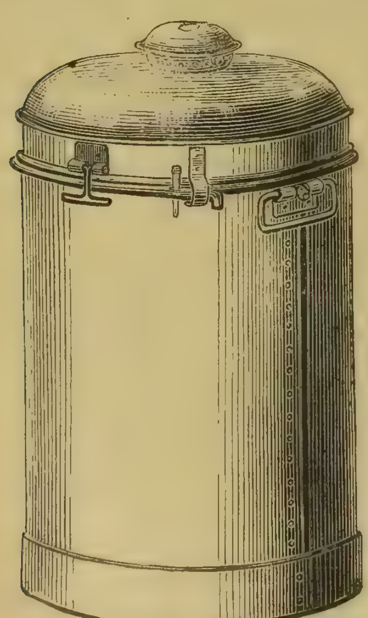
Vinegar is in high repute as a cure for almost everything from gall-sickness to imaginary loose teeth, but it is very questionable whether it has any curative action whatever. There is a very common belief that it has the property of dissolving the hard contents of the third or leaf stomach (blaarpens), but any action it has in this respect is more probably due to its stimulant action or to other stimulants with which it is often combined, such as mustard or pepper.

Bluestone is a very good worm medicine but requires great care in its administration and in measuring and mixing the drug so that the proper strength which experience has shown to be safe may be obtained. Dr. Hutcheon recommended it for wire worm (haarworm) in sheep, 1lb. of bluestone to be dissolved in sixty bottles of water, and that 1½ ounces to 5 ounces of the solution be given to lambs and sheep, according to age. Three to six months old lambs getting 1½ ounces and so on until 5 ounces for those eighteen months old and over. It is always best to mix the quantity required for the whole lot and then dose a few to try the effect, picking out the weakest for the experiment. Like all worm medicines the best results are attained when the sheep have been fasted for twenty-four to thirty hours and being kept away from water for the rest of the day on which the sheep are dosed. It is not safe to leave the dosing to anyone as great care is required, for if a little only gets into the lungs inflammation of the lungs will be set up and may cause the death of the animal.

— Stockholm Tar. —

The writer has had success in the treatment of wire worm in sheep by administration of Stockholm tar. The dose is one to two tablespoons on the tongue, repeated two or three times with intervals of four or five days between the doses, and where sheep have got too weak to stand bluestone, Stockholm tar will be found a safer remedy to use.

Calomel is often given in cases of gall-sickness and is a very useful remedy for this complaint. Cattle take 1 drachm or 60 grains, and it is best given dry on the tongue as it will not dissolve in water, and if put into a bottle of water and well shaken up it will be found that the beast gets the water and the calomel all sticks around the inside of the bottle. A better plan is to place it dry on the back of the tongue, it can then be washed down with a bot-



tle of water, eight hours afterwards give 1lb. epsom salts dissolved in six bottles of water, the action of the salts being hastened if the water is warm. Calomel can also be given to dogs in 10 grain doses for biliary fever, it can also be used for the inflammation of the eyes which is so common in this country amongst cattle. A little of the dry powder either being blown into the eye or placed inside the lower lid, it will often clear up the so-called film in a few days. A little applied as a dry powder to saddle galls and sores quickly dries them up.

Cooper's Dip can be used as a very effective medicine if care is used in its administration, but as it contains arsenic it must be remembered that it is very easy to poison stock with it unless reasonable care is used. It is a very good worm and blood medicine, and is also a preventive of geilziekte in sheep. It is usually given dry mixed with common salt in the proportion of one part of dip powder to ten of salt, the dose of the mixture for a sheep being one teaspoonful.

Jeye's Fluid, Little's Dip, Kerol, and dips of this type may be given internally, but small doses, say, up to half an ounce, are quite sufficient, and although very much larger doses may be given without appearing to do any injury, the desired result is attained with the smaller dose. In cases of chronic indigestion in which the animal frequently becomes hoven, any of these dips are effectual in checking undue fermentation and acidity; for animals with sore mouths or injuries to the tongue or lips, a solution makes a nice gargle or wash. As a dressing for wounds and for syringing out abscesses they are hard to beat, but of course must be used in weak solution, and in the treatment of strangles (nieuweziekte) in horses a little placed into some boiling water at the bottom of a bucket, then some hay, straw, or similar material placed on top so that the animal cannot scald his nose, and the bucket placed at the bottom of a sack with its mouth tied to the noseband of the headstall, will enable the animal to inhale the steam which arises, and will bring away any discharge and help to bring matters to a head very much quicker than without the treatment.

Coffee and Tea.—Both these contain an active principle which is now considered to be identical. Strong solutions of coffee and tea are stimulants and may be given warm in cases where a better and more prompt stimulant cannot be obtained, but they require to be made strong and to be given in considerable quantity.

Lime-water is very easy to make and should be more used than it is, as it is very useful in the treatment of indigestion and diarrhoea in all classes of patients. Calves which are being fed by the bucket often cannot assimilate undiluted milk, and benefit is almost always derived by mixing the milk with one-fourth to one-third lime-water, which prevents acidity and also the coagulation of the milk into large tough indigestible masses. Lime-water is prepared by adding 2 ounces of slaked lime to six bottles of water, stirring briskly, allowing the undissolved matter to subside, and after a few hours pouring off the clear solutions which is to be used.

Oil of Eucalyptus is found in most houses and can be used in most cases where turpentine would be used, but the dose must not be more than half an ounce for horses or cattle, and it must be given in either a bottle of weak dop and water or in a bottle of milk.

Mustard, although not much used internally, is of very great service as a blister; a paste is made with cold water (not hot) and rubbed well into the part, left on for twenty minutes, and then washed off or it is apt to leave a blemish; as an illustration of where it may be used it can with advantage be applied to any slowly forming abscess that it is desired to bring to a head, such as the one between the lower jaws which usually develops in strangles (nieuwezietke). Two or three dressings well rubbed in will either cause it to burst naturally or will make it so ripe that it may be opened with a pocket knife, afterwards syringing out with a weak solution of dip.

Ginger and Cinnamon may be given with epsom salts to check undue griping, or with bicarbonate of soda for indigestion, or with stimulants or turpentine and oil in cases of colic in doses of one ounce each for horses and two ounces for cattle.

Chillies, Cayenne, and Black and White Peppers may also be used in a similar manner if so desired, but not more than one drachm should be given to horses or two drachms to cattle as large doses irritate.

Dogs can be conveniently treated by using many of the pills which are in common use, such as Beecham's, Carter's Little Liver Pills, Blaud's tonic pills, etc.; the actions are the same as for human beings and the dose for a very large dog being about the same as for a full-grown person, a small terrier taking about the same dose as a young child.

In this article when a "bottle" is used as a measure an empty whisky bottle is meant, and as no proper measures may be available, the following domestic utensils may be used. Common tumblers contain from eight to ten fluid ounces, teacups five to seven fluid ounces, wine glasses two fluid ounces, tablespoons half a fluid ounce, dessertspoons two fluid drachms, teaspoons one to two fluid drachms, a drachm being sixty drops or minims.

In conclusion, do as little "doctoring" as possible; don't use powerful drugs, always give fluid medicines by the mouth, not by the nose, trust more to good nursing than doctoring, tempt your patient to eat by giving a little and often, always remove the remains of the last feed. If it is necessary to bottle food or liquid down the animal remember there are such things as milk, milk and lime water, well made gruel, milk with a little dop or whisky, tea made by pouring boiling water on to lucerne hay and allowing it to cool, etc., and either move the animal into the shade or build a temporary shelter of sacks over it; if unable to stand do not let it lie on one side for long, turn it over or prop it up with sacks filled with sand, and don't take the advice of ten people at once—try one at a time.

Butter Making

By Edwin H. Webster, Chief the Dairy Division, United States Department of Agriculture, in Farmers' Bulletin No. 241.

(Continued from March Issue.)

— The Principles of Separation. —

The force that is used to separate the milk is known as centrifugal force. This force may be described as the pull that is felt when a weight attached to a strong is whirled about the hand. It is the pull outward, and the faster the weight is whirled the stronger the pull becomes. In the old system of creaming, the separation is caused by the action of gravity. The fat globules, being lighter than the other portions of the milk, are forced to the top; that is, gravity acts stronger or pulls harder on the heavier portions than it does on the lighter, and the milk is gradually arranged in layers, the lighter portion at the top and the heavier portion at the bottom. The force acting in the separator has precisely the same action on the milk, but acts outward from the centre of the bowl the same as gravity acts downward from the surface, only many thousand times stronger, accomplishing in a few moments and far more completely what it takes gravity several hours to do.

As the milk goes into the bowl it is at once thrown to the outermost parts and fills the bowl completely until an opening is reached where it will flow out again. The surface of the milk is on a line parallel with the centre, or axis, of the bowl, and is exactly in line with the cream outlet. A cross-section through the bowl from the surface to the outside presents much the same appearance as would a pan of milk after the cream has raised by gravity. The cream is on the surface, which might be called the top, and the heavier portions of the milk at the point farthest from the centre, which would represent the bottom.

With this understanding of the arrangement of the milk in the bowl there are a number of things to be observed which influence the separation. The difference in length of time it takes to separate cream by gravity and by centrifugal force shows plainly that the time varies with the amount of force applied. The shorter the time the greater the force must be. Skim milk from the separator contains less fat than that secured by the gravity system, showing that the greater force causes more perfect separation.

From the above statements the following conclusions regarding the use of the separator may be drawn: (1) If the amount of milk that passes through the separator in a given time is a fixed quantity, any increase in the speed of the machine will tend to cause closer skimming because of the greater force exerted; (2) if the amount of milk that passes through in a given time is increased and the speed remains the same the skimming will not be so perfect, for the centrifugal force is not exerted on the milk so long a time. It is evident, therefore, that the closeness of skimming is the result of two factors—time and force. If either of these is decreased, the result will be poorer work. If either is increased, better work will result.

— Common Errors in Operating Separators. —

Two errors are made in operating separators because of ignorance of the facts just stated. The first consists in allowing too much milk to pass through the machine. As there is a limit to the practical speed at which the machine can be safely run, it is not good practice to try to overcome the error referred to by increasing the speed beyond the safe point. The feed outlet is usually fixed so that too much milk will not run through, but cases have been known where operators, anxious to shorten the time of separation, have enlarged the opening, allowing too much milk to pass. This error is not so common as the second, which is to allow the speed of the machine to become too slow. The slow speed does not generate enough force to skim properly, and the result is loss of butter fat in the skim milk. The number of revolutions per minute required by a machine is usually indicated on the machine or in the instruction book belonging to it, and this should be strictly followed.

— Best Temperature of Milk for Separating. —

All liquids flow more readily when warm than cold. This is

not as noticeable with milk as it may be with molasses, but the principle holds just as true, and is readily shown in the separation of milk. Every one has observed that cold cream does not flow as readily as warm cream. As cream is one of the products of separation, and has to flow from the machine through a small opening or outlet, it is seen that the warmer it is the more readily it will flow. If the flow of cream is checked, more milk will be forced out of the skim milk outlet, and if the obstruction to the flow becomes too great, butter fat will go out with the skim milk, because it cannot move fast enough through the cream outlet. For this reason, the nearer the temperature of the milk approaches the animal heat the better will be the separation. While some machines are supposed to skim milk as cold as sixty-five degrees F., it is not good practice, because the skimming will not be so close. The milk should be at a temperature of eighty degrees or higher. It will be seen, therefore, that a third factor, in addition to rate of feed and speed of machine—namely, the temperature of the milk—has a direct bearing on separation, and it may be accepted as true that the warmer the milk the better the work.

— Regulating the Flow. —

All separators are supplied with some device for regulating the proportion of cream to skim milk. In some this is done by adjusting the cream outlet, while in others the adjustment is in the outlet for skim milk. The principle on which the adjustment is based is not difficult to understand. In the arrangement of the outlets the difference of specific gravity of the cream and skim milk has to be taken into account. To use again the illustration of the string and the weight, it may be observed that the farther the weight is placed from the hand the harder becomes the pull on the string if the same speed is maintained, and, similarly, the heavier the weight the harder the pull. If two weights are taken, one a little heavier than the other, and both are whirled about the hand, it is observed that the lighter weight would have to be farther out on its string to exert the same pull as the heavier weight.

In the separator bowl the outlet for cream and the outlet for skim milk have to be nearly the same distance from the centre in order to retain the milk in the bowl long enough to allow the separation to take place. Cream is lighter than the skim milk, else there could be no separation, and this fact makes it necessary to place the cream outlet a little nearer the centre than the outlet for skim milk. The skim milk is taken out at a point farthest away from the centre of the bowl by means of tubes or a disk of some kind. The skim milk is the heavier, and if the outlets were the same distance from the centre would force most of the contents of the bowl through the cream outlet. In order to overcome this effect the skim milk outlet is placed a short distance farther from the centre of the bowl than the outlet for the cream. This balances the two portions, so that the division of cream and skim milk is near the desired proportion.

From this it can be seen that any change in the relative position of these outlets changes this balance. If the cream outlet is moved nearer the centre of the bowl, more milk is forced out of the skim milk opening. If it is removed farther from the centre of the bowl, more milk is forced through the cream opening. If the adjustment is made in the skim milk outlet precisely the same thing occurs. If the outlet for skim milk is moved nearer the centre of the bowl it forces more cream through the cream outlet, and as it is moved away from the centre of the bowl less cream will be forced through the cream outlet. When less cream is delivered it contains a greater percentage of fat than when a larger quantity is delivered. This is due to the fact that the skim milk is taken from the extreme outer edge of the bowl. Arranging the outlets so that greater or less quantities pass over this point to the skim milk outlet does not change the character of the skim milk, but does change the quantity that is left to pass out with the cream, making more or less cream, which will test accordingly.

Sometimes dirt is allowed to accumulate in the skim milk tubes or in the cream outlet. Any accumulation of this kind will change the percentage of butter fat in the cream and the proportion of skim milk to cream exactly as if there had been a change made in the position of the cream or skim milk screws.

The various internal devices used in separators serve two purposes—they cause the milk to flow through the bowl in a uniform steady stream, and serve to divide or distribute it so that a greater surface is exposed at one time to the centrifugal action. The more evenly the distribution is made throughout the bowl and the quieter the currents of milk flow the greater will be the capacity and efficiency of the machine.

— Summary of Points to be Observed. —

To summarize, the points in the operation of a separator, given in their order of importance as bearing on the quality of the work, are as follows:—

First—The speed of the separator must be uniform and up to the standard required by the makers of that particular machine.

Second.—The temperature of the milk should be such as will make it flow readily; the warmer it is the more perfect will be the separation.

Third.—The amount of milk that is run through the machine would remain constant, and should not be increased over that which is intended for the machine.

Fourth.—The machine should be set on a solid base or foundation, so that there will be no jar or shaking about as it is turned, such as would tend to interfere with the even flow of the milk through the bowl, and thus destroy its efficiency in skimming.

Fifth.—The separator must be kept thoroughly and scrupulously

clean, particular care being taken that none of the tubes through which the milk flows become obstructed in any way.

Sixth.—The test of the cream can be readily changed by changing either the cream outlet or the skim milk outlet.

In the mechanical operation of a machine none but the best oil should be used, and this should not be allowed to gum or become dirty on the bearings. It is good practice to flush the bearings with kerosene occasionally by making a run with kerosene in the oil cups. This will serve to cut out any gum or dust that has accumulated in the bearings and will make the machine run much freer and easier, thus greatly increasing the length of time that it will last and do perfect work.

— Separating the Milk. —

The milk should be separated as soon as possible after milking, while it still contains the animal heat.

— Use of Strainers. —

If milk has been handled in a cleanly way during milking it can be poured directly into the supply can of the separator without straining. The dairyman who depends upon the strainer to clean the milk rather than using cleanly methods of milking is the one who makes the poorer butter. If it is necessary to strain the milk a very fine wire strainer should be used. It is very difficult to keep a cloth strainer in good condition, and if not kept in a good condition it is a seed-bed for trouble. When a strainer cloth becomes yellow it rarely ever smells clean, indicating that decomposition is going on and that it is not fit to use. For this reason it is best to discard strainer cloths entirely. If a strainer other than wire is used, it is best to employ some material such as absorbent cotton that can be thrown away at the end of each milking.

— Operating the Machine. —

Before starting the separator the operator should look carefully after the bearings or wearing parts, putting a drop or two of oil on each and noting whether the oil-cups are dropping properly. Instructions for care and oiling come with each machine and they should be heeded. The makers have studied this problem and are bound for their own protection to give proper instructions for operation. In the winter time, when the separator bowl and parts are cold, it is best to pour a quart or so of hot weather through the machine just as it is started. This warms up the surfaces and prevents the milk from sticking, as it would if cold. It also makes the cleaning of the separator much easier and prevents its clogging up at the start.

Bring the machine gradually up to its normal speed and then turn the milk in slowly until the valve is wide open. Keep a constantly uniform motion of the handle during the entire run. When all of the milk has passed from the supply can a quart or so of the skim milk should be caught and poured through to flush out the cream that will remain in the bowl. Unless this is done some of the butter fat will adhere to the surfaces and a small amount remain in the centre of the bowl, not being able to get out of the machine because there is no more milk flowing in to force it through. Pouring in the skim forces it all out. Warm water may be used for this purpose, but usually it is not so convenient.

— Care of Cream after Separation. —

The first work on completion of the separation should be the care of the cream. It is the product for which all of the previous work has been performed and it is worse than folly to neglect it now it is secured. The cream must be cooled at once, to check the growth of bacteria. The best method for doing this is to place it in a deep, narrow pail immersed in cold water just pumped from the well, and then stir it gently until it is brought down to nearly the temperature of the water. A good dairy thermometer must be a part of the equipment of every dairy, and all temperatures should be taken with it—not by guess. It will take but a few minutes to cool the cream down in the manner described. As soon as it is cooled cover the pail in such a way that it can be entirely submerged in the water. The ordinary shotgun can, as it is commonly called, having a cover that fits over the outside, coming down about two inches, with catches to hold it in place, is the best kind of vessel for cooling and holding cream. When a can is entirely submerged it is protected from the heat of summer, the cold of winter, and the contaminating odors that may be in the air; and the surface is effectually kept from drying, leaving the cream in as fine physical condition as when separated.

(To be Continued.)

The Wool Clip.

— Annual Review and Statistics Compiled by Dalgety & Company, Limited. —

We have received a copy of Dalgety's Annual Wool Review for Australasia for the past season, published by Dalgety & Company, Limited, which is now in its fourteenth year of issue, and, as customary, appears to have been carefully written, while the statistics which relate to the whole of the Australasian sales are complete and comprehensive. There are a number of interesting facts given in the publication, the most prominent of which probably is that the value of the past season's wool production in Australia and New Zealand, for export, was 29½ millions sterling, as compared with 31½ millions sterling for the previous season, the difference in the value of the two clips being accounted for by the average value per bale in 1911-12 having been £11 15/5, and in 1910-11, £12 10/4.

— A Record Clip. —

As was forecasted in Dalgety's last year's Annual Review, the Australian clip exceeded that of the previous year, which stood at the high water mark and was above the general average of excellence.

Actual oversea shipments of wool during the past twelve months have amounted to 2,020,547 bales (or 662,845,907 lbs.) from the Commonwealth, and 493,368 bales (or 169,915,939 lbs.) from New Zealand, a total of no less than 2,513,915 bales, or 832,761,846 lbs., valued at £29,591,874.

The total value of the 1,926,926 bales sold in Australasia has been £22,682,090, as against £23,346,602 in 1910-11.

— Australian Sheep Numbers. —

The flocks in Australia and New Zealand now total 117,011,645, having increased since last year's returns were published by the comparatively small number of 977,481 head. Sheep numbers have remained practically stationary during the past three years, but the figures are higher than during any period of the past 18 years, the previous record having been in 1891, when the total reached 124,991,920 head.

The smallness of the increase in recent years is largely attributable to the very large numbers which have been slaughtered for export and local consumption, and it is significant that the opinion is generally held that sheep numbers were, prior to the drought, quite as high as could safety be carried in normal seasons.

There has been a general all round improvement in the larger flocks, and a very high standard has been reached, especially in respect to merinos, a fact which will be appreciated when it is remembered that though there were many more sheep to shear, say 20 years ago, the clip shorn during the past season eclipses all previous records, while the weight cut per head is greater than in any country in the world without any deterioration in the wool, which comes an easy first, though it may not be so fine in quality as formerly.

— Future Prospects. —

As regards the future, Dalgety and Company, Limited, say that there are several factors which are likely to have an important bearing on the course of the wool market during the ensuing twelve months, the first of these being the certainty of diminished Australian wool production owing to the severe, though short, drought recently experienced throughout most of the woolgrowing districts of the Commonwealth. Another is the great probability of a revision of the American wool tariff in favor of oversea woolgrowers, some pronouncement in respect to which may be expected after the Presidential election in November next. The third is the fact of favourable trade conditions generally, practically only affected at the present time by industrial troubles.

Summing up the position, as it affects wool producers, they are of opinion that the ensuing Australasian clip will come on to a favourable market, and that there will be a strong demand from all sections of buyers at prices showing an improvement on the rates in force in the past season. The clip as a whole cannot be equal, either in quality or condition, to its predecessor, in addition to which it is inevitable that there will be a lighter cut per sheep, so that the enhanced values which it seems very likely will rule should compensate growers to some extent for the drawbacks which we fear most graziers will experience.

Botanist: "This is the tobacco plant." Fair Visitor: "How interesting! And when does it begin to bear cigarettes?"

Sheep-Breeding in Australia.

It is difficult to imagine that little more than a century ago sheep-breeding was an unknown pursuit in Australia. According to an interesting account of the early history of pastoral farming in Australia in the Melbourne Argus, in the first return of live-stock published in 1788 the total number of sheep in Australia was only twenty-nine, so that the pastoral pursuit which to-day is so prominent and important a feature in the welfare of Australia may be said to extend over only a single century. The first introductions of sheep were made from the Cape of Good Hope, and, as might be expected, the animals were of an inferior description, and gave such a poor account of themselves that the conditions in Australia were officially described as unsuitable for sheep, and led to the opinion being formed that the stock-breeding resources of the country would depend upon cattle. Three years later a consignment of fifty ewes and one ram, also from Capetown, was landed; but this, apparently, gave no better results than the earlier arrivals, and it is possible that but for an incident which will ever be associated with the agricultural prosperity of the antipodes, sheep-breeding in this country would not have been established upon a substantial footing till a later date than the closing years of the eighteenth century. The writer in question gives an interesting account of the arrival in Australia in 1790 of young Lieutenant MacArthur and his wife, his petition to the Governor of New South Wales for grants of land, and his early endeavours to stock his possessions with sheep from different sources. He commenced with fifty Bengal ewes and six or seven rams of mixed English and Spanish descent, and from this small beginning his stock-breeding enterprise steadily developed and improved, until he found himself the owner of a flock which at that time was regarded as extensive. Macarthur must have been a man of shrewd foresight, as well as of great energy and daring, for although several of his purchases and exploits seemed to court disaster, everything turned out successfully, and to him is attributed the distinction of having laid the foundation of sheep-breeding as a national pursuit in the great Australian colonies. Like most pioneers of industry Macarthur had many obstacles to contend with, and not a few exciting adventures with superior officers and politicians, but he seems to have met his critics and detractors without fear. On one occasion he was sent to London to be tried for some unexplained offence, but the officials at the War Office refused to try him, owing to the absence of witnesses, and practically advised the King to overlook the case. The involuntary trip to his native country was turned to good account, as he brought back with him in 1804 pure-bred merino rams and one ewe, and this consignment, which cost him £135, had a most impressive influence upon the quality of his flock. He must have made good use of the imported blood, for in 1820 he astonished his neighbours by obtaining as much as 10/4 per pound for a bale of wool. This price made his success, as there naturally resulted such a keen demand for rams from his flock that prices up to £300 were paid.

Lime and Its Uses.

It is said that farmers as a class are rather neglecting the use of lime; they are depending too much on chemical manures, and omitting to give the soil a dressing of such a necessary constituent of lime. If so, this is a matter of regret, because the crops will suffer in health and quality. Some chemical manures, such as sulphate of ammonia and kainit, use up the lime in the soil, and all fertilisers, by increasing the crop, increase also the consumption of lime. It is therefore the part of a good farmer to see that the soil of his farm is well supplied. The action of lime hastens the decay of vegetable matter and sweetens sour lands which may have been more or less submerged. It increases the capillary condition of soil, prevents fungoid diseases, and promotes the growth of more nutritive herbage in pastures; it also decomposes minerals in the soil, containing potash and other food constituents, and renders them available for the needs of the plants. Further, it decomposes organic matter and promotes the important process which is so much in evidence at present—"nitrification." Thus, to sum up, lime may be said to have a mechanical, chemical, and biological action, and the importance of a systematic application of this invaluable fertiliser to lands which are at present in lack of it should be apparent to all agriculturists. When this need is supplied many of the ailments from which stock suffer from lack of this very necessary substance in plant food will be avoided. Acidity of the stomach, so frequently met with amongst cattle, is attributable to want of alkaline matter in the food supply. Malformations at birth, particularly with foals and lambs, can also be traced to the same cause. The lengthened anaemic period on light country, has the same cause of origin.

Dairy Notes.

Every time you scrape a tin dairy vessel with a knife or spoon, or anything hard, you take off a little of the tin and make it so much easier for rust to get its claws on the spot.

The folks who buy milk want pure milk, and the purity of the milk is entirely within the control of the ones who milk and handle the milk. The milking should be cleanly, and the milk utensils must be faithfully washed, scalded and aired every day, even if other duties and pleasures have to be sidetracked.

It will mean a loss to the farmer to have the cow afraid of him. It is a loss every time she is frightened. To run a cow to pasture is like throwing money away. A cow in any way worried will not do her best. The cow that is made a pet of will make money for her owner. The milk of a frightened or abused cow is unwholesome.

Undoubtedly one cause of much trouble with milk in summer is allowing cows to have access to foul, stagnant water. Such water is teeming with all kinds of impure organisms, which attach themselves to the cows' udders and flanks by means of the mud with which the cows cover themselves. Such water is further entirely unfit for cows to drink. Cows need clean water as well as man.

The development of competent dairymen is just as important as the development of cows. These highly specialised cows require judicious and kindly treatment. Neglect will not only be reflected in the churn, but disastrous and costly deterioration will quickly follow. A generation of neglect will practically undo the work of a century. The culmination of the breeder's art must be supplemented with correct methods of feeding and proper handling.

The dairy business is one that requires as much careful attention as any other business. The proprietor of a dairy should know how much profit each and every cow is producing. Why should he feed and milk a cow that does not produce an ample profit? Why should he keep twenty cows instead of ten, when the profit is the same? The only reason for a man's doing this is that he does not know which cows are the poor doers and which are the profitable ones.

The real foundation of farm dairying is good stock, and right there is where we find room for the greatest improvement. The average farmer seems to be contented with cows "like pap had." Dairy products are selling at a good price, and the farmer should endeavour to increase the yield of his cows, and the cows should not be what are called dual purpose cows. They should be bred for dairy cows alone.

To keep milk and cream sweet and free from taints during hot weather is not a difficult matter, provided a reasonable amount of care is taken to keep the milk clean and cold. By spending a few extra minutes each day brushing off the loose dirt on the cow's udder and flanks before milking, a large percentage of the dirt and bacteria that ordinarily get into the milk will be eliminated. Every particle of dirt or dust that gets into the milk carries with it hundreds and even thousands of bacteria, and it is these bacteria, more than the dirt itself, that sour and taint the milk and cream.

One of the grestest needs on the average farm at present is a better class of herd bull. The potent influence which the bull exerts on the quality of the herd should make him a matter of first importance with every dairyman. It is a common saying that "the bull is half the herd." Usually he is more than half the herd. Where a pure-bred bull is used with grade cows, the offspring will take largely after the bull, because of his greater prepotency. While a high class bull costs perhaps two or three times as much as one of the common run, we do not know of anything in the dairy line that brings greater returns for money invested than that invested in a first class bull.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

One might easily lose 25 per cent. of his milk returns (writes G. F. C. in "New Zealand Farmer") by neglected sore teats. The sores should be checked at the onset, and ointment be used unstintingly, when they appear. A very nervous cow—and are they not all nervous?—will easily hold up a pint of milk each milking, probably increasing the amount withheld as the sores grow worse. It is false economy therefore not to use the ointment. We have used acetic acid on the teats for sores and cuts, and find it the best thing of the half-dozen we have tried. The action of the acid mentioned is peculiarly suited to the teats, as, instead of creating a scab, which comes off every milking, it heals up the sore quickly and cleanly, and is painless.

Dairying has made wonderful progress throughout the world since the advent of the factory system of butter making. The customer of butter has not only been benefited by being furnished a more wholesome and palatable article of food, but the wife in the farm has been relieved of the drudgery of making butter on the farm. Where formerly the cream was ripened and churned into butter under conditions not conducive to fine quality in the finished product, and the majority of cases by unskilled hands, now the milk or cream is delivered to a modern factory where conditions are suited to the purpose of making butter, and the result has been a wonderful improvement in the quality of our dairy products. As the quality has improved, consumption has increased, and the progress of dairying has been remarkable during the past decade.

Reliable Saddlery and Harness.

Good reliable harness is essential to the man on the land, but, unfortunately, in harness, as in the case of other manufactured articles, "things are not always what they seem," and it is, therefore, only adopting a wise precaution to procure such from a maker of established reputation - the man who has a record of many years of honourable and straight business methods at his back. Indeed, there is so much "shoddy Material" on the market and so well is the material "got up" as far as appearance is concerned, that the method indicated is, nowadays, the only reliable one open to the purchaser who desires honest value. In regard to harness, in particular, the buyer must be able to rely not only on the quality of the material but on the work put into the same—either is useless without the other. Here, we may remark, that those who send their orders to Mr. C. H. Lehmann Adelaide's progressive saddler and harness.maker, have the satisfaction of knowing that both these important points may be relied on. It is many years since Mr. Lehmann commenced business, but when he did so he decided to build up his establishment on sound lines and deal with his patrons as he would himself be done by. How well he has succeeded is best demonstrated by his steadily increasing connection, the most satisfactory feature of which is the large proportion of old customers. Experience has shown Mr. Lehmann that, give the public a good thing, and they will show their appreciation in a practical manner, that is by becoming regular customers and this, indeed, is the only way in which any business can be satisfactorily maintained and extended. Of course in addition to quality of material and workmanship good value as regards price is also essential, but excellent value has always been a special feature of the goods supplied by Mr. Lehmann. Prices, it is true, are slightly in advance of what they were a year or two ago, but this advance when considered in connection with the great advance that has taken place not only in regard to raw material but also wages is very trifling. It is, indeed, only through a large turnover and by adopting the latest methods of manufacture that such values are still practicable. The disastrous fire which occurred some eighteen months ago at the corner of Grenfell Street and Hindmarsh Square necessitated Mr. Lehmann's securing temporary premises for the time being. He is, however, now thoroughly settled again in his old location, but with greatly improved premises, where he will be pleased to see any friends when in town, specially during show time. Mr. Lehmann, it may be added, is something more than a manufacturer of the every-day lines used in his business, for he is an inventor of no mean ability, as it proved by his patent automatic horse collar, now used by the principal Fire Brigades throughout the Continent, by his improved horse winkers and many other devices. Some years ago his attention was drawn to the hideous contrivances worn by children with deformed or imperfect feet—contrivances in which clumsy iron rods and other unsuitable materials were freely used. Deeply alive to the suffering entailed thereby Mr. Lehmann set his inventive faculties to work, and as a result evolved a purely leather boot suitable for the worst cases, and which besides giving great comfort to the wearer so nearly resembles the boot on the sound foot as to pass almost unnoticed. As a commercial speculation we do not suppose it has greatly benefited the inventor — he has not even patented it—but only the leading surgeons of the city can adequately appreciate the boon this "improved boot" has been to suffering children, and they are loud in their praises. Although his business demands close attention, Mr. Lehmann wisely has interests outside it, and his services in connection with the political party with which he is associated are widely esteemed and appreciated.

Poultry Notes

Chicken Talks.

Getting the chick out of the shell is only a small part of the poultry business.

Many people can run an incubator, but the brooder beats them.

The finest brooder ever made won't do the work better than an old hen; but the wooden one is open for business all the time.

To grow chicks you must know them—not only the outside, but the inside—and study their small likes and dislikes.

One brooder and fifty chicks doesn't necessarily mean fifty grown fowls in six months time.

Don't start too big; a little brood well reared is better than a large one buried.

To give them a good start, breed them only from healthy parents, and you should rear 95 per cent.

A roupy parent means a sick chick, and a direct temptation to profanity.

If you want to succeed, read about chicks, talk about chicks, but above all watch the chicks.

Chickens cannot talk, but can be more eloquent than a 10/6 book, to the one who knows them.

Chickens were meant to eat and drink, to live and thrive.

Man sometimes decides that they shall mope and die, but it isn't their fault.

Chicks, like children don't want coddling. Warmth, fresh air, sunshine, exercise, and food is all they ask for. Don't forget the fresh air and sunshine and exercise and warmth—see?

Warmth for the first few days is, perhaps, the most important, with pure air, but don't roast them. That should come later.

You need not have the skill af a cabinetmaker to manufacture a brooder, but you must have commonsense.

Many a champion has been reared in a kerosene box, with a bit of flannel and a stone ginger beer bottle.

But a larger number have passed out of existence via a ten guinea death trap.

A brooder should provide a constant supply of warm, dry air. Can you figure out one for yourself. Don't forget, warm, dry, plenty. If not, buy a good one.

Top, bottom, or side heat all have staunch advocates, but a little of all is a safe middle course.

So arrange the ventilation that when you open the brooder in the morning you don't lose your appetite for breakfast.

The chirp of a happy chick is pleasant, but the cry of the comfortless is worse than a tin whistle.

When you open the brooder at night and find the chicks squatting comfortably around you may wager they will lay eggs some day.

But if they are piled up and trampling on one another there are going to be troubles—bowel troubles for one, bronchial trouble for another.

A stuffed chicken is a sign of good cookery but poor poultry keeping.

Dry feeding has saved more chickens than the cats have taken, and may be counted in millions.

The gizzard of a chick was provided for use, not ornament. Some feeders appear to regard it as an accident.

A well-reared chick is not a glutton, but it can get outside and amazing lot of green stuff.

A well brought up chicken is a cleanly little beast—when it gets a chance.

Evolution of Artificial Incubation.

By Rev. C. E. Petersen, in American Poultry Journal.

The wonderful progress in inventive science is best seen by going back to the primitive methods of our forefathers, and yet in very many of these rude contrivances we find the germ of what is to-day a fully developed piece of intricate machinery, that in many instances almost seems endowed with reason.

It is at least interesting to follow in some detkil the evolution of our modern incubatar by going back to the origin of this useful invention that no single man can lay any claim to, but which is a combination of many men's minds, and though the modern incubator is far from being perfect in many of its details, it is so great an improvement over the primitive ethods that we have put it within the reach of every poultry man that cares to use it in his hatching operations, and very few there are that do not take advantage of it.

That Egypt is the cradle of artificial incubation cannot be successfully contradicted, anyhow we cannot go back farther for our information, and therefore will give an account of how an Egyptain "Mamal" or hatching oven is constructed and operated to-day, as it was in the time of the Pharaohs thousands of years ago.

The hatching oven or "mamal" is built with brick, about nine feet high, with a gallery in the middle, three feet wide and eight feet high; on each side of which is a double row of rooms, each three feet wide and four or five feet broad, and twelve or fifteen feet long, and each capable of containing four or five thousand eggs, deposited in such a manner as not to touch one another, upon a mat or a bed of flax.

At the outside of one angle of the building there is a fire-place, from which the heat is conveyed to both stories by means of flues, during three

(Continued from page 134).

First Principles.

From "Reliable Poultry Journal."

It was not many years ago that the tone of the literature of poultry journals was all optimistic. Of late years there has been a tendency to admit that the poultry business has problems that must be solved before it can be made a success. Poultrymen are not "quitters," however, and they are busy trying to discover the cause in these problems. Having discovered that there is a well-defined cause for each result obtained, they have made great strides ahead. The experiment stations have done and are doing good work along this line, and everywhere there is a tendency to talk of "results" and not "luck" as formerly.

I have a great many visitors at my place, being somewhat a poineer in this business in my state, and it amuses me to hear these visitors talk. Few of them have had any experience, but their confidence is prodigious. I do not like to be a wet blanket nor do I think they necessarily are going to fail, but I do think that there is less counting on loss in the poultry business than in any other business in which a man engages. A prospective merchant counts on bad debts and other losses, and in every line of business this is considered, except in the poultry business. I am convinced that in our business, a man's failures are the making of him, if he can hold out long enough to win out; and starting big is just where beginners lose out. This does not mean that I do not believe in large plants, for I certainly do; but a big plant has all of the proper facilities, while a beginner cannot possibly be properly fixed. It must come by degrees, as experience teaches the need.

— Failure almost Inevitable. —

A visitor recently told me he was going into the poultry business this year and that he expected to hatch over ten thound chickens and raise over eighty per cent, notwithstanding the fact that it takes a very good poultry man to raise eighty per cent, and the further fact that he had almost no facilities for doing so. I suggested that this was a large number of chickens and that they would require a considerable amount of brooderage. "Oh, I shall not hatch them all out at once," he replied.

I then suggested that chickens do not do well when crowded. He replied that he was aware of the fact and that such a measure would not be wise. I though as Bill Nye said, it would be decidedly "other wise."

But this man is not really alive to the fact that crowding is unwise—is fatal. He will not know it until experience teaches it to him. He is a man of good ideas, and has a sound head, but he does not understand nor realize that there are natural laws governing animal life that are as invariable in their workings as is the principle that water will rise no higher than its source.

This man expected every fertile egg incubated to hatch. Like all beginners he thought he could get ahead of all his competitors by hatching in December and January, not realizing that eggs are as dear as young chickens at that season; nor did he take into account the fact that fertility is not high nor strong during the winter months and that hatches at that time of the year are rarely successful.

He expected to raise his chickens in home-made brooders, putting a hundred in each brooder. And they were so poorly constructed that he could not possibly get a higher temperature than seventy degrees! He does not know that heat is the great essential for all growth, both animal and vegetable. It takes such men as these about a year to come to the conclusion that there is nothing in the poultry business.

—Overcrowding Fatal. —

The artificial method of raising chickens (in brooders) is still in the experimental stage, but I am convinced that the nearer we can get to the natural method in the artificial way, the more successful we shall be. The hen succeeds better than a brooder she has a more limited number of chicks. I feel certain that many of the ailments of brooder-raised chickens, not excepting white diarrhoea, result from the great number kept together.

We know that the mortality among children is fifty per cent, yet among aur friends we do not see any such alarming death rate. But this high rate of mortality does exist, being made up in the crowded districts of our large cities. Right here is a lesson for poultrymen. Look for the cause of the high rate of mortality in the crowded districts of our large cities and you will find that the deaths are due to bad conditions and bad food which have lowered the vitality of the parent and children.

Not only is this true of the human race, but you will find it is the same with other animals. Put over fifty sheep in a pasture in a thickly settled community, and they will promptly dieout. I am aware that out west on the prairies this is not so, owinb, probably, to the sparseness of population, but it is true of a thickly settled community.

When it comes to chickens, crowding is fatal to their development. Crowd your chickens and they will die off until only those that can live in the allotted space survive. Grown hens are not so affected. The struggle for existence with them is not so great, they having already made themselves, as it were, and how they only have to sustain themselves, without making any growth.

Recently I saw fifty mule colts, in one pasture, which were being fed on a splendid, balanced ration. They made no growths and consequently were very unsatisfactory. I suggested to the owner that he separate them. He did so, and in two weeks the improvement was remarkable, although the new pastures were not one bit better than the old ones.

My hot-water-heated brooder was designed to hold two thousand. I find that one thousand chicks do twice as well in it, and even then I separate or remove them at three weeks of age to individual brooders. When I first started out I had twelve acres in a colony yard: now I have colany yards all about my place, and I am very careful not to put over two hundred and fifty chickens in each. Now I raise them formerly I did not.

— Inbreeding, Ventilation, Range. —

I consider the keeping of a limited number in the brooders and the separation of the older chicks into small flocks essential to success, although there are some other things equally important—not to inbreed, for instance. I write myself down as opposed to inbreeding, in spite of the fact that some of our best poultrymen favor it. We have all seen the results of cousins marrying deformities, consumption, idiocy—and science tells us we are only higher animals. Inbreeding weakens chickens beyond a

doubt, and, in my opinion, the heritage of vitality is the best inheritence a chicken can have. I use trap-nests and breed from my bestlayers, but I introduce new blood every year and I have nothing to complain of in my egg receipts.

I also favor fresh air for hens, young chickens, brooder chicks, and every other fowl. I ventilate my breeding and colony houses as well as my brooders by tacking yellow cotton cloth over the windows, and I find a great improvement in the vitality of my stock. I am careful about the temperature of my brooder, getting up at night to replenish the fire, but no matter how cold it is I have the fresh air enter through the cloth-covered windows.

I also believe in a considerable range for breeding stock. A large lot has been inclosed with wire at the bottom of the runs in front of my breeding houses. I also have one in the back. During the breeding season I turn about fifty hens into the front lot and fifty into the back lot, and I find this increased range greatly improves the fertility of the eggs. Too many hens in one flock will cause an alarming decrease in the fertility, and I believe that close confinement will eventually ruin the fertility. It is an interesting fact to note that animals kept in confinement in our zoos are very poor breeders, some of them being entirely sterile.

By studying the poultry business as you would any other enterprise in which you would risk your time and money, it can be made most profitable. But in my opinion it is a working-man's business and not a good business for a rich man to run with a manager, as an iron in the fire out of which he can make a lot of money. He seldom does it. It takes personal interest in the business and plenty of work from the self-interest stand-point to make a success of the poultry business.

Mishandling a chicken means spoiling a pullet, cutting the prifit, and killing your interest in poultry. Don't do it.

Color Feeding of Black Fowls.

(Continued from last issue).

In making these late experiments I worked on the idea that yellow corn contains a coloring matter which produces bronze barring in the plumage, but the result in experiment No. 2 has placed a different light on the subject and will be well worth while working ont more thoroughly in the future.

Experiment 1.—A four-year-old hen that was bred from a line of exceptional color and had always shown a clear, even, rich glossy green color, free from bronze or purple, was placed in a coop where no sun rays could reach her and confined so that she could not obtain any grass or food of any kind other than that given her. She was fed exclusively on whole and cracked yellow corn all through her molt. The result was that she showed bronze barring throughout her plumage.

Experiment 2.—Two hens that were of a dull black color, almost free from any greenish sheen, were handled throughout their molt the same as in experiment 1. The result was that no bronze barring was produced, but their color was improved to quite an extent, showing considerable greenish sheen free from bronze or purple. This was a surprise to me and was a result I was not looking for, especially the improvement in color, and brings up the question, Does the corn supply coloring matter that will improve the color in plumage where it does not already contain in its natural state all that it will stand, but in other cases supplies an excess of color which produces purple or bronze barring?

However this one experiment is not sufficient to warrant such as being a fact, but as it is conceded by breeders that purple or bronze barring is the result of any excess of color, it is very reasonable to suppose that such may be the case.

Experiment 3. — An exceptionally strong colored cock bird, free from bronze or purple, (aways had been so, from a chick) was placed in a pen 10 by 12 feet with a large run contain plenty of grass and shade and was fed on yellow corn exclusively. The result was he showed bronze barring, but not nearly to such an extent as the hen in experiment 1. This would indicate that the grass, seeds, etc., obtained in this run offset the effect of the corn to some extent.

Experiment 4.—A high colored cock bird free from bronze or purple was confined in pen and run same as cock bird in experiment 3 and fed on a ration one third wheat and one-third oats, with an occasional light feed of buckwheat as a change of diet. This bird did not show any bronze barring and at a glance his color looked perfect, but upon close examination a bluish bar could be detected now and then across a feather, more especially in some of the wing feathers.

This would indicate that the effect of the corn was not so great on account of the amount fed and was offset, to an extent, by the other food consumed.

Other than the birds used in these experiments, my birds were allowed the free run of the farm as soon as the breeding seasan was over, the same as in years past, and no corn is fed until they are all through their molt and housed again for winter, when the cold weather sets in, and I have found with this treatment the color question is the least of my troubles.

From the result of the above experiments, the questions in my mind now are: Does the yellow corn supply a foreign colouring matter that enters into the feathers, producing purple or bronze barring, or does it increase the color thus producing purple or bronze barring, from an excess of color. The question is one of rapidly increasing importance.—Reliable Poultry Journal.

(Continued from page 131).

or four hours daily, at stated intervals.

Ventilators are also used, lest the heat should be too great —, the standard temperature being that of the warm baths of the country.

About the middle of January the ovens are inspected and repaired; and ,as they are public, and as each has a circuit of fifteen or twenty villages, notice is given to the inhabitants so as they may come and bring their eggs.

As soon as a suitable quantity of eggs is collected together they are put into the rooms that are to serve for the first brood; for the whole of the ovens are never employed at once on the same brood, but only one-half of those which the building contains.

The eggs are ranged three deep in the lower rooms of each oven on a bed of chopped straw and dust, which mixture Aristotle probably mistook for dung, and several centuries later misled the great French investigator Reaumur in his experiments.

As the fuel burns away it is renewed three times a day and as many at night, with the same pre. caution each time to open up for a few moments the hole in the roof.

The fire is thus continued during ten days; a long experience, a skilful hand, and the application of eggs against the eye balls are the only thermometers used in Egypt for regulating the temperature.

During that space of time the eggs are often turned and examined, and those that are clear, addled or with dead germs in them are thrown out.

On the eleventh day the second brood is forwarded by placing fresh eggs in the interior cells of the six ovens left empty at the first brood, and the furrows of their upper cells are filled with lighted fuel.

As soon as the fires are lighted in these ovens they are put out in the others, so that the eggs of the latter are no longer heated, but by the fire lately made in the former, and only receive heat by the side windows in the upper chambers of the ovens, which remain constantly open.

The second brood thus got forward, they take from the lower rooms of the ovens first used, one - half of the eggs, to lay them out on the floor of the upper rooms.

This change is made because these eggs require the greater care the nearer they draw to the time when chickens are to issue from them; and by being on the floors may be inspected, turned and taken up with greater ease.

When the twentieth day of incubation is arrived, some chicks are already seen to break their shell, the greater part issue on the morrow with or without help; but few wait for the twenty-second day.

The strongest chickens are taken to the room allotted to them, and from there are distributed to those who furnished the eggs, and who obtain two chickens for every three eggs; the weakest are kept a few days longer.

We have chosen this description of the Egyptain method from a number of treatises on the subject, because of its clear and concise statements.

On the revival of arts in Europe the Egytain method of artificial incubation spread successively to Malta, to Sicily, to Italy and then to France and England.

Mains tells us in his Treatise that one of the dukes of Florence sent to Egypt for a Bermain to superintend a hatching oven for him; and Alphonsus II of Naples set up one at his country residence.

Charles VIII of France in 1496 had one built at Amboise, and Francis I another at Montrichard.

There is a curious entry extant of the expenses of the oven at Aimboise, which runs thus:

"Paid to Messer Nicolas Vigans, an Italian, for fourteen days by him taken and employed for working an oven at the said place of Amboise, for hatching and rearing chickens without hens, which he has done for the King's pleasure, during this time, at a rate of four sols two deniers per day, and has been paid, as appears by his receipt, the sum of fifty-eight sols four deniers (about five shillings).

"To the said, the number of 1,300 eggs by him bought at the aforetime in order to have them hatched and have chickens for the said, at the rate of four sols deniers per hundred."

In the year 1750 a work published in Paris and in the same year translated into English, giving in detail what was comprehended in the title of the book: THE ART Of Hatching and Bringing up Domestick Fowls of all Kinds, At any Time of the Year. Either by means of the heat of Hot-Beds or that of Common Fire.

(Continued on Page 138).

Exhibition Poultry and Its Influences on the Industry.

Of late years a very sharp line of demarcation has been drawn between those who breed poultry and show them, and those who breed poultry and do not show them. More than that, those who do not show their poultry have made very strong statements about the unwisdom of those who do so—or, to lift the question out of all its personal aspect, have unhesitatingly asserted that poultry shows have done unmitigated harm, that before such shows were held poultry were in all ways better than they are now, and that the fanciers and exhibitors have spoilt every breed which they have taken up.

I use the term "exhibition poultry" in the heading of my paper because it was chosen for me, and it doubtless was chosen because it is current in common parlance. Like many current terms it is not very accurate nor felicitous, for it may seem to suggest that "exhibition poultry" are a race or a collection of races of poultry as distinguished from non-exhibited races, instead of being the best (whether rightly or wrongly thought so is not the ques-

tion) of all races, which are on that account exhibited.

Poultry shows have originated within living memory. I do not pretend to say what was the immediate cause which brought them into vogue; probably a conjunction of causes did so. Such as:—

1. The publication of such books as Dixon's "Ornamental and Domestic Poultry," and somewhat later that of "The Poultry Book," by Wingfield and Johnson, which drew public attention to the fact, known only to the few before, that the varieties of poultry were many, some of them very beautiful.

2. The fact that the English world began to travel far more than aforetime on the Continent of Europe, and was there struck by the fact that eggs and poultry were more plentiful than at home, inclined our country-men and country-women to ask themselves, "Why should this be so?" and to look favourably upon any means which drew attention to poultry breeding, and I think no impartial person can deny that the earlier poultry shows did so in a remarkable way.

3. A general love of competition, born of an age of progress The Royal Agricultural Society, and many other like societies, had through shows, stimulated an improvement in the breeds of horses, of cattle, of sheep, and of pigs. Might not a like improvement in poultry be brought about by like means? Lastly, poultry shows had scarcely been started when a further stimulus was given to their promotion by fresh importations from the East.

"Poultry were better before there were poultry shows, therefore what good have they and the fanciers done?" The statement is one easy to make, and not very easy either to prove or disprove. There are very few whose memory goes back to a time before there were poultry shows at all; still fewer who had then arrived at a time of life when they were likely to make an intelligent generalisation on such a subject.

I come to what I can speak of with more confidence — viz., my own experience. I have kept two old English breeds, or call them, if you prefer it, two varieties of one breed, for over thirty years—I mean Dorkings, the one silver or light grey, the other pure white, rosecombed. I assert without the least hesitation that they are to-day far more hardy and far more productive, as they are more symmetrical and more beautiful, especially so the white breed, than they were when I took them up.

In boyhood I started Dorkings on the gravel of Middlesex, proverbially good for poultry. For the last twenty years I have kept them on the heavy and sticky loam of the Valley of the Wye; not an ideal soil for fowls. Then I was much troubled with 'bumble foot," or rheumatism; I have almost forgotten what it was. Dorkings were then poor layers; nowadays mine lay so incessantly that a large number of them never go broody at all, and I have to fall back upon others hens as foster-mothers. To what do you attribute this improvement? is a question which will naturally be asked. First of all I attribute it to the fact that in the case of these breeds at least, the requirements of intelligent fanciers have been entirely in accordance with the requirements of utility. A given compactness of form with deep breast has been the first point insisted on, and that because it is the form which gives the maximum of delicate meat. Even the requirements of feather are not so absurd and arbitrary as people try to make out. One of these two varieties, to suit the fancier's eye, should have pure silvery, not straw-coloured hackles; with the other it is de rigueur that its plumage should be white all over, without tinge of yellow. These are the so-called "fancy points" in which I have lived to see—I hope in a small way to contribute to—the greatest improvement.

"What can it really matter," I have been asked, "whether your fowls look white or yellow?" It matters just this much. A yellow tinge in light-coloured fowls, certainly in these breeds, is a sign of tendency to jaundice; and liver complaint is about the most fatal, the most contagious, and hereditary complaint which can devastate the poultry yard. Here, is, I think, a clear instance in which poultry shows, and breeding up to a show standard, have done something for a profitable and a pure race.

But it may be said there were good and pure breeds before there were fanciers, certainly before there were exhibitions. The latter statement is undoubtedly correct; I doubt if the former is so, for from the minute descriptions of the points of pure-bred poultry which we find in old books from that of Columella downwards I am inclined to think that the production of these breeds ages ago was probably due to men who were fanciers as well as utilitarians. Good pure breeds there certainly were 100 years ago. I very much doubt whether, apart from the interest—the intelligent interest, as I think—which fanciers have bestowed on their perpetuation, those breeds would to-day have existed in anything like purity.

"It is all the fault of shows and of fanciers" we are told. I very much doubt it; experience leads me to disbelieve that a really good established and acclimatised breed can so easily be spoilt. The fact of its rapid deterioration shows that it never was a good breed, or never was suited to our climate, or was not in any true sense a pure breed at all! And here I would draw the widest distinction between the old breeds, which have stood the twofold test of time and of climate—i.e., which have proved good and useful through dozens of generations, and that in our British climate, or some part of it, and newly produced or newly imported so-called breeds, often little more than cross-bred, which have stood no such test at all.—"Poultry."

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide. Telephone, 1234.

Preparing for the Show Room.

From "Reliable Poultry Journal."

Let it be understood in the beginning that all the skill and knowledge of those of experience in the art of fitting birds for the show room cannot transform a second rate specimen into a prize winner. Neither can a bird of royal pedigree, standard weight and fashionable markings win unless in the pink of condition. Hence the successful fanciers of today, throughout poultrydom, are those who raise the very best birds and show them in the best possible condition.

Competition in the modern show room is so keen, and the work of the breeder in producing high scoring specimens so far in advance of what it was twenty, or even ten years ago, that a bird to win, must necessarily be shown in perfect trim and must have been hatched well from vigorous, healthy ancestors of highest quality, and from chickhood up to the show room should have the closest care and the benefit of proper feed, range and attention.

I do not say this to discourage the fancier of limited experience who exhibits his birds for the first time. On the contrary, he is the fellow I want to assist, and I urge him, no matter however good or bad your birds may be, show them in their best possible form in order to learn from your score card what their merits and defects may be.

The word "condition," as defined by the American Standard of Perfection, has a broad meaning, and in its direct application to a fowl, means health, cleanliness and beauty of plumage. These qualities cannot be given to a bird in a day or a week, but are the result of good breeding, proper feeding, shade, fresh, clean water, clean, dry, well ventilated quarters and good range during the early period of growth. Six weeks before the opening of the show season, select from your stock a number of the largest, most shapely and best marked birds, which should be placed in large yards with shade and grass run, if possible—(cockerels in separate yards from pullets). The roosting house should be kept scrupulously clean by use of lime disinfectants and insecticide. Examine birds closely and if infested with mites or lice, get rid of them at once by insect powder, or some standard remedy. The perches in the house should not be over twelve inches high and should be removable. In the yard keep clean, fresh water that should be renewed several times daily during the warm weather. In good sized shallow boxes grit, charcoal and crushed shell should be kept. Now comes the question of feed that will insure health, growth and bring out the plumage in clear, clean colours. Gradually work the birds into a ration that is well balanced, and one that contains the greatest possible variety of food that a bird will eat, and feed plentifully. I have never yet found that I was feeding young growing stock too much. They may tire of one kind of feed and perhaps leave it untouched. This is not due to the birds not being hungry—on the contrary, they may eat freely of some other food, if given it. Hence, the necessity of variety. I feed sound grain, principally wheat, milk, cabbage and, at noon daily, a mash composed of two parts bran and two parts corn meal and one part ground beef scraps mixed with milk. The evening feed is wheat, corn or sunflower seed, and of the latter I think highly, as they exert a most beneficial effect on the growth of feathers. Bear in mind that in following this plan, I am feeding for condition. Condition that means health, cleanliness and beautiful plumage. I want no pale combs and shanks, dull colors in plumage and slender, meagre necks. The birds must have the essential elements in food to make bone and feathers, as well as flesh, and this ration gives me better results than anything I have ever tried. The ground beef scraps is twice the quantity some of our best breeders recommend, but 20 per cent. animal feed in the mash does better for me than 10 per cent. Milk is objected to by some, but I have yet to find it harmful. I substitute when I can, cut bone instead of the beef scraps, but cannot say it is any better, and only do so for the sake of variety. The same may be said of oats and other grains. They are good, but no better than wheat. My method is not a model one for feeding. The birds are never without feed, contrary to the rule practised by many breeders of feeding just what will quickly be eaten up clean, but it gives me good results, both in the show room and in the breeding pen, after the show season closes.

Follow this plan of yarding and feeding up to a week before the time for shipment to first show. Weigh your birds often and look them over each night to see that they have full crops and then begin the final work of preparation for the exhibition.

If you have kept everything perfectly clean, aod your yard has been shaded, it will not be necessary to wash your birds unless

they are of some white breed, and possibly not then unless the atmosphere of your premises is filled with dust and coal smoke. But if your birds are not clean, snow white, you better wash them. Use castile soap and warm water, making a thick lather which should be applied freely, but gently, to all feathered sections of the fowl. Spend some time in this and work the lather profusely into the feathers to the skin. When thoroughly "lathered," hold birds by feet and head and draw through a tub of warm water (not hot) repeatedly, until feathers are free from all soapy matter. Then fill the tub again with water and rinse thoroughly. Ask your wife to prepare the tub as she would in bluing the white garments of the weekly wash, and in this "blue" water give the bird its final bath. Place the bird after pressing out all the water you can with your hands in a slatted coop with open side to a warm stove and keep there for several hours. The bottom of coop should be covered with an inch of shavings, sawdust or fine cut straw. Don't let the bird get too warm, neither should it get chilled, and after being partially dry, if the day be warm, put coop where bird may be in the sunshine. Be careful to keep bird out of drafts while wet, for colds are easily contracted during the washing process. This plan works wonders with a dirty bird, but to my mind the whiteness is not as pure and attractive as that of a bird that is of the "stay white" kind, and that has had the benefit of clean quarters and environment that are conducive to "stay whiteness."

Now that your bird is washed, dried and clean, place him in an exhibition coop. Set coop under shelter, but in the light. Water and feed as usual and invite your friends to see him. If he is disposed to rebel at his limited quarters and get frightened at the approach of strangers, you will find it necessary to spend some time in getting him to stand naturally, and to become accustomed to visitors. My plan with a wild bird is to feed sparingly but often, and all visitors who come, as well as different members of the family, approach him with some dainty bit of food of which he is fond. Two or three days of such treatment generally overcomes all disposition to shyness and the birds get to enjoy the attention of visitors. In such cases care should be taken to feed freely at night all the bird will eat.

It is most important that your birds get this training, for without it the confinement in new coops, the noise of the show room and the attention of the show patrons will frighten them until they stand awkwardly, out of shape, and present anything but a high-bred appearance, and when in the judges' hands cannot receive its just score for shape. The day before shipping take your bird from the coop for a final inspection and the freshening touches. Look carefully for broken feathers, which should be removed. Then wash legs, feet and toes with warm water and a soft brush. If lines between scales on legs are filled with dust, remove with toothpick, but avoid scratching. Dry with cloth and dry thoroughly. Then apply with finger a small amount of vaseline or sweet oil, and spend some time in rubbing or polishing with flannel cloth until the bright natural color of feet and legs is brought out.

Wash next the face, wattles, beak and comb. Rub comb very gently, else it will present a raw appearance. Apply to it a little sweet oil and it will look bright, clean and of fine texture. Go over the entire body of the bird with a flannel cloth to remove dust. They are now as fit as you can make them. Feed, water and ship in all wood light shipping coops, with solid sides but slatted tops. Straw, chaff or sawdust should cover bottom of coop, and do not crowd the birds in shipping, else you may have wry tails and broken feathers. Neither should you place large and small birds in same coop, or birds that are strangers to each other. Coop together only those that have been raised together, and only show in the show room birds of agreeable dispositions in same exhibition coop. Where two or more are cooped together, one may be the controlling spirit, and dominate the others into a dejected, crestfallen, "hen pecked" appearaoce.

Arriving at the show rooms, take birds from coop, and never catch a bird by legs in taking from coop. Carefully but firmly grasp it by the wing joint next to the body and draw it out head first. Look them over carefully to remove the dust of travel. Give comb, feet and legs a careful cleaning. Water and feed lightly and trust them to the mercy and wisdom of the poultry judge.

Do not feed too heavily until the judging is over, as an oyerfed specimen looks dull, sluggish and is lacking in that bright, active, snappy appearance that pleases a judge. Throughout the continuance of the show, water carefully, but feed only moderately, and of as great variety as you can get. At night, if the light burns all night, drop a curtain or newspaper over front of coop to exclude light.

Now a bit of experience in the matter of weight. "Won on weight" is a proverb of the show room, and Judge I. K. Felch says "you are beaten before the show opens if your entries are below weight."

Last winter I was fitting six head of young B. P. Rocks for a show and had them just about the weight limit, when a perfect epidemic of cold ran through the entire flock. The weather was damp, dismal and cloudy and the birds for days refused to eat and lost rapidly in weight. But the colds were treated successfully and with a change to better weather the birds improved and appetites returned. Corn, boiled milk, a rich mash and raw beef was fairly crowded down them. Pepsin and charcoal tablets were given them to prevent indigestion and bowel trouble. At the time of shipment they had made a decided gain, but were still below weight. The ride of two hundred miles did them no harm, and in the morning of the opening show they were lively and hungry. They were given all the water they would

drink, then mica grit was given, followed by corn, which they ate greedily. Their crops seemed full, but when a pound of raw beef, cut fine, was given them they ate it with a relish. This was heroic treatment but was justifiable, for a half hour later, when the clerk weighed them, the wisdom of such feeding was apparent. Four of the six went good full weight; one pullet was a quarter of a pound overweight and the cockerel almost a half pound. True, the crops looked unshapely, but as the judge did not reach them for several hours after the weighing, the work of digestion reduced the crops aod the birds seemed bright and lively. One pullet scored 94, another 93, and the whole lot went above 91.

Now as to after results. I write this for the benefit of certain people who persist in the statement that "show birds are pampered and do not make good breeders." The cockerel above mentioned went direct from the show room to the breeding yard and was mated to eight hens. Eggs from this hen hatched splendidly—the chicks were as healthy and strong as ever I raised—some of them now five months old are very promising candidates for blue ribbons. The 94 point pullet was mated to her sire and is the dam of an even dozen beautiful pullets that will equal, and some of them may exceed, her score. The entire lot is alive, healthy and have been good breeders.

In conclusion, a word in regard to the treatment of old stock. When the breeding season is over the entire lot is turned out and given free farm range. Their feed is somewhat reduced to induce "worm hunting" and "bug chasing." This exercise and reduction of grain feed brings about a decrease of flesh, but an increase of health. About August 1st they are put on a good feed, principally corn and sunflower seed. This puts on flesh rapidly, the old feathers drop out and a new dress of bright, strong colors come on quickly. During the month they are kept in the shade as much as possible, for the hot August sun of th s climate is damaging to the right colors of new feathers. Feed plenty of charcoal, but no milk, and only about one-half the animal food given to young, growing stock. The legs of old stock intended for the show room should be treated occasionally with a lotion of two parts kerosene, three parts lard, to which add a few drops carbolic acid. This keeps the legs smooth and clean. Otherwise treat old stock as you would young birds.

To recapitulate: Observe absolute cleanliness in feeding, yarding, cooping and housing, and handle your exhibition stock often until they feel at home in a coop before a crowd of admiring strangers. The secret of the whole matter, if there be any secrets in the matter, is to get your birds to present to the judge the shapely carriage you see so often in the yard.

Evolution of Artificial Incubation.

(Continued from page 131).

This book, containing 171 pages, gives in detail the author's experiments in artificial hatching and misled by some inaccuracy in a passage in Aristotle, who says the Egyptians cover eggs with dung in order to hatch chickens — a circumstance quite impossible. M. Reaumur tried various ecperiments in hatching artificially by means of heat generated from fermenting dung, and, after numerous disappointments, at length succeeded in hatching about two-thirds of the eggs which he tried.

He first put eggs into an earthen pot and then placed them in a layer of dung, but after a few days found that the eggs had been partly boiled.

He next made some shallow boxes, somewhat in the form of a hot-bed, which he sunk into the dung, and in them placed his eggs. Two of them, at the end of two days, showed the beginning of a germ, which gave him great hopes of ultimate success.

But, after a few days, the stench coming from these eggs gave him notice of one more failure and disappointment.

These accidents were then almost cantinuous, and the chicks died in the shells long before the day they should have hatched.

He then began to regulate the heat, and though the heat was kept at the requisite degree, no hatch resulted.

At last, after the loss of a very great number of eggs, he discovered that it was the vapor exhaling from the dung that was the cause of their death.

This vapor was considerable and easy to be perceived on the inside of the box and, sometimes, even the eggs.

M. Reaumur then made a cask, which he sunk into the dung, leaving the top of it open, and inside of this cask placed baskets with eggs in them leaving a cover for the top of the cask, which he could slide open at will, so as to regulate the heat and furnish ventilation.

The days now passed one after another and none of the eggs inside the cask had given out the slightest token of corruption.

On the twentieth day the chicks began to pick through the shells and make their voices heard, and on the following day a number of the eggs had hatched and a number of sprightly little chicks were ready to begin life in this world.

One can readily imagine the pleasure this success gave the experimenter,

who, for twelve months, had worked on this problem without bringing a single egg to a success issue.

The termometer used in these experiments was of a rather rude construction, being nothing but a glass vial filled with a lump of butter, melted, and in it as much tallow as there was butter.

The heat of the egg chamber would render the liquid in the bottle very thin if the heat was too great, or the lump would remain fixed in one place if too small an amount of heat was present, but if the temperature was right it would flow in the bottle like thick syrup.

Placing the bottle in the bosom before putting into the cask would show how the mixture ought to look.

That any success was obtained at all with such crude method, is more of a surprise than the failures, and goes to show that a good many of our modern contrivances may not be so necessary as we think they are.

Later on M. Reaumur tried the fire of a baker's oven. A small carriage on wheels was constructed, in which were several drawers for containing rows of eggs, which could be moved and examined at pleasure, in a chamber placed over a bread oven.

M. Reaumur was so successful in these experiments that he was of the opinion it might be advantageous, in point of economy, to introduce this later method extensively.

He says where there are not the convenience of a bread oven a hatching oven might be constructed, with a stove in it to furnish the heat needed for bringing the eggs to a successful exclusion.

M. Reaumur's method was followed by others, with more or less variations in the methods of procedure. A Mr. Dubois made a heated chamber, in which he suspended baskets full of eggs from hooks in the ceiling, and by lowering and raising these baskets the heat was well regulated. It is not stated how well this method succeeded.

Next in order comes M. Coppineaus, with the introduction of his hot water system, which he carried in a pipe along the floor of a chamber, so constructed that, beside the hot water pipes, flues for the purpose of ventilation and regulating the heat, was made possible. He also placed vessels of water in the room so as to render the air in the room moist. This is without doubt the first method of artificial incubation by the means of hot water.

A number of these hatching ovens were constructed, some of brick and of earthware, but little by little discontinued as they were found useless for any practical purposes, one of the makers confessing that he could not average more than one chicken from every six eggs.

What may possibly be the first incubator invented is the one described by Oliver de Seres, the father of French agriculture. He says it was made of copper or iron, in which eggs were arranged and surrounded by feathers, and covered with soft cushions, heat having been communicated by means of four lamps, and the oven was small and portable, but he says that it was more af a curiosity than anything else and would not be of great use.

During the year 1815 Mr. Lawrence, the English writer of a Treatise on Domestic Poultry, says that he tried an experiment in artificial hatching that, on the second trial, proved successful.

He wrapped a number of eggs in wool, put them into a wicker basket, covered with flannel, and suspended this over a chaffing-dish of charcoal in a chimney, where there was no other fire, the chimney screen being constantly kept fast to concentrate the heat.

The degree of heat was judged every three or four hours, by the feeling, and the eggs were constantly turned and transferred from the centre to the circumference of the basket.

About thirty or forty healthy chickens were obtained on the second trial from forty-five eggs.

In 1839 was shown in London at the Egyptian Hall the celebrated Eccaleopian, which was examined by an immense number of persons.

This estalishment was in a large room in the Pall Mall and it consisted of a large hatching oven, which extended along one side of the room, with an enclosure of similar size on the other for the chickens; while at the bottom of the room was a glass case, in which the chickens were put when first hatched, and in the centre a saucer, with eggs broken, to show the different states of progress of the chicken during incubation.

The oven was divided into eight compartments, each of which was furnished with a glass, and each contained a shallow box, lined with cloth, and the bottom covered with two or three hundred eggs, laid carefully, so as not to touch each other.

The boxes were heated with steam pipes and a jug of water was placed in each to insure a moist atmosphere.

In each box the eggs were in a different state of advancement, the object being to have several chickens hatched every day, in order to gratify the curiosity of the numerous visitors of the establishment-

The chickens, as soon as they were hatched, were put under the glass case at the end of the room till they were two or three days old, after which they were removed to the enclosure opposite the oven.

The enclosure consisted of a platform with a railing around it and row of coops for the chickens to run into, and boxes for them to sleep in at the back.

Here they run about, picking up bruised grits and other food, all day; and at 6 o'clock in the evening they were put to bed, twelve together, in the boxes behing the enclosure—the boxes being lined with flannel, and having a flannel curtain in front.

The chickens, when three weeks old, were sent to the market and sold at about a shilling each.

The eggs for hatching were brought in the common market, and nearly one-half of them proved to be addled, but the chickens hatched were strong and healthy, and not more than one in fifty died after they had left the eggs.

The name of the proprietor of this establishment was Mr. William Bucknell.

In a later edition of Mr. Dickson's work, from which the above statement was taken, he says "The Eccaleopian, through it excited a great deal of attention when it was first exhibited, never became generally useful, and, in fact, from the great number of eggs spoiled, it was by no means economical.

It was accordingly abandoned and after a lapse of years another scheme was devised, which was patented abaut 1844, under the title of Cantelo's Patent Incubator.

The principal difference in the two plans is that, in the Eccaleopian the heat was applied from below, but in the Patent Incubator the heat was applied from above, so as to imitate, as near as possible, the warmth of the setting hen.

The machine, says Mr. Dickson, consists of a long counter, the top of which is filled with hot water contained in water-proof cloth, resting on the eggs, which were arranged in a sort of a drawer.

What Made the Difference?

Mr. A. was born and raised on a farm, that is, he had stuck to the farm until he was twenty-one, then like many another country boy he had taken his fate in his own hands and gone out into the work to seek his fortune.

This oftimes fickle dame favoured him and he became prosperous, and finally the manager of a large mercantile business. But often in his hot, stuffy city office he smelled in imagination the new mown hay and scented the sweet perfume of clover fields, and promised himself that some time he would return to the country and spend his old age in the open air and perhaps raise poultry or small fruits. The time came sooner than he had anticipated. An unexpected failure left him stranded and almost a financial wreck. Now he would leave the unfriendly crowd and seek the delights of the country once more.

Believing that was "money in poultry" he secured a few acres of land with a small house on it and with his wife in full sympathy they returned to the country to try their fortunes in this new field. The first thing Mr. A. did was to subscribe for two or three poultry journals. From these he studied carefully the most approved methods of feeding and breeding, the different styles of poultry houses, etc. The next step was to build an up-to-date poultry house facing the south with scratching sheds—a wise point—and oiled curtains that could be raised or lowered, according to the weather.

This he proceeded to fill with two of the best breeds of poultry that could be obtained. Everything was now ready and Mr. A. expected to fill his baskets with and his pockets with money while eggs were so high. That was the proper time for hens to lay, but these particular hens evidently thought different.

Among other things he had not failed to study up all the diseases which were supposed to afflict even the best of hens. Mr. A. carefully watched his flock for "symptoms" which did not fail to appear. As a result a hen hospital was improvised in one corner of the kitchen and as it was seldom without an occupant the good wife demurred, and as the cellar was light and dry Mr. A. set up a stove and removed the hospital to the privacy of the cellar. Here he faithfully treated the different ailments with the most approved remedies. Some rewarded his efforts by living, others became food for the crows.

It was late in the spring before his hens began to lay. Some of them never laid at all, and Mr. A. was forced to the sad conclusion that he had been the victim of the lust for greed on the part of some brother poultryman.

However, by the first of May he had saved a sufficient number of eggs to start the 200 egg incubator which he had placed in his cellar awaiting developments. When these had been brewing a couple of weeks he accidentally left them out too long when cooling and they became chilled, so he had to start all over again. The second batch proved more successful, and in due time a goodly number of little yellow fluffy things were ready for the brooder. It is needless to say that they were carefully watched and tended, but in spite of the best of care and feeding the majority of them pined away and died.

All this was discouraging, but as Mr. A. was a very persistent man he started out the next year with hopes of redeeming his fortunes. But alas! the second year proved to be very much like the first with some minor variations.

Then Mr. A. lost patience. He would turn the poultry business over to his wife. The business was only fit for women, and he would spend his time in something that paid. Mrs. A. was also raised on a farm, and among her pleasant recollections of childhood days was the caring for and feeding the poultry which wandered at will over her father's broad acres. In those days she had never heard of a sick hen, she did not believe in sick hens, and the little chicks left to the maternal instincts of their natural mothers grew to henhood strong and robust. So Mrs. A. cheerfully accepted her charge. She fed and watered and cared for her brood very much as her husband had done, only she omitted the scattering of seed between meals, as she did not think it best to disturb the hens too often. She always talked to them kindly and encouragingly and I really believe they looked forward to seeing her and hearing her voice as much as they did to the dinner which she brought them. Early in December they began to lay and there was no stopping until moulting time.

In the spring a few of the hens were allowed to become mothers, and so faithfully did they fulfil their part that a yardful of strong, healthy chickens were ready for the next winter's laying.

What made the difference?

The Sitting Hen.

The following facts respecting the powers of the hen as a hatcher may prove interesting and profitable to your readers. I have long thought that the power of the broody has been underrated. Experiments have been tried here this season with a view to testing the full capabilities of the hen as a hatcher. The result is that four black Orpington hens hatched ninety-two chickens from 100 eggs, black Orpington hens hatched seventy-five chickens, one hen hatched twenty-seven chickens from twenty-eight fertile eggs, and another twenty-four from twenty-five eggs. The largest brood was by a white Wyandotte hen of medium size, and about 5lbs. in weight; she hatched twenty-nine chickens.

The modus operandi is as follows:—A number of hens are placed on about fifteen to eighteen eggs each; these eggs are tested at the eighth day, those which contain dead germs and "clears" removed, and the hens are then placed on full nests of twenty to twenty-five fertile eggs. This is the general rule here now. The extra large hatches mentioned were special tests. Broods of sixteen to twenty-two are of common and regular occurrence with one of my hatchers, but it requires skill and care to accomplish these results, and discrimination in selecting the hen. It must also be understood that these results are for hens set from the third

week in March and onwards. I do not think we have yet fully developed the question, and next season a further trial will be made, especially in respect of the earlier months. Then I think fifteen eggs would be enough, as although I believe the hens would hatch more, yet their powers of rearing would have to be complemented by artificial means. In large coops hens can rear broods of twenty to twenty-five in April and May.

The nest boxes are about 16in. square, with a movable shutter in front, which fails to reach the top by 2in. These boxes are placed in tiers, and as the hatching houses are near a river and in a valley, no earth is placed under the hay of which the nests are composed. The hens are taken off at regular periods every day and tethered by the leg in long rows, with access to water, grass, and ashes, and are fed on maize entirely. When replacing, a number of eggs are taken from the nest and placed in the operator's cap, these are put back under the hen as she settles down. It is well to remember that some hens spread themselves out, and can cover more eggs than others.

To get the very best results it is best to test again on the 15th May, and remove any addled eggs there may be, as an egg of this kind is not conducive to a high average, especially if it should burst. May I ask amateurs to bear the following points in mind? An egg that does not hatch is not necessarily an infertile egg. I have eggs returned each season as infertiles or "clears" which contain embryos, from the three or four days old germ to the dead in shell on the point of pipping. An infertile egg is clear at the end of even twenty-one days with little or no smell.

If a hen breaks an egg, or fouls the nest, be careful to wash the remainder with tepid water. Never set hens on nests to come on or off at their own sweet will; this accounts for many a bad hatch, for which the seller of the eggs is blamed. Nests want carefully making. Keep the corners well filled up with the hay.

In conclusion, I would remark there is a good deal more in successful hatching with hens than many at first imagine.—From "Poultry."

Fattening Fowls.

From "Poultry."

The good prices to be obtained for fine table fowls should tempt poultry keepers who have plenty of space to give some attention to this branch of poultry culture. In some districts, fattening is carried on by special "fatters" who buy up the chickens in their neighborhood and confine them to a regular diet. But in many other parts there are no professional "fatters" and the chickens are sent to market by the farmers and others who rear them without any preliminary preparation in the matter of feeding. Those who have eaten fowls that have been fattened have generally found them superior to those that have gone through no preparation. It will be remembered that the term "fatted" does not mean that the fowl is to be loaded with fat; only, that the quality of the flesh is to be improved and made tender and that the quantity of meat is to be increased.

The splendid specimens that are to be seen in the table poultry section of the Palace and other shows are strong evidence of the improvement that can be wrought by clever feeding. The weight per pair of some dead chickens exceeds twenty pounds and this will give an idea of what can be produced with care and skill. There are so many breeds of fowls suitable for the table that there is no excuse for the miserable little chickens still so often seen, which will not lay on flesh, however well they may be fed. There is no better fowl for eating than a cross between the Dorking and Indian Game, bred from the Dorking cock and Indian Game hen, or from the sexes reversed. The Langsham, too, is an excellent bird, with a quantity of meat.

To fatten fowls, they are confined in coops or pens and fed at regular periods on a fixed diet. When first shut up they are fasted for about twelve hours, to give them an appetite for the new treatment. They are fed three times a day at stated times. The food usually consists of soft meal, corn meal, pea meal, barley meal or ground oats. This is mixed to a thin state with skim milk and given in a wooden trough, fastened to the front of the coop or pen. At the end of about a week the food is made thicker; some beef or mutton fat is added, the quantity of which is gradually increased. No water is required and grain is not necessary, though some fatters give boiled barley for the last feed in the day. Some flint grit is provided and some boiled nettles two or three times a week. The food must never be given when stale or sour. If a bird appears not to thrive during the process, it should be turned out in an open run without food for twenty-four hours and then replaced in the coop and tried again.

Some chickens fatten much more easily than others, but about three weeks is the usual time for the treatment to continue, before they are ready for the table. After a chicken is fattened it will not remain in the same state but will go off and become out of health if the same diet is persisted in. It is therefore necessary to calculate the time, if the birds are required for eating at any particular date. No amount of feeding will make on old fowl tender; skillful cooking can alone do this. A cockerel that has been allowed to run with hens will as a rule prove tough and hard.

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Pigeon Notes.

Victorian Notes.

(By G.J.M.)

The North Suburban Show of 1912 is now a thing of the past, and a splendid function it was!

There was a record entry in almost every class, and I do not think that the quality was ever before equalled. As usual the Homer classes were overflowing, and a fine lot of birds were staged. The Jacobins were a splendid lot, but marked improvement was shown in Magpies, Owls, and Short-faced Tumblers—particularly the first and last named varieties.

And now I want to take off my hat to the Fantail Club! I ask the members of that body to accept my heartiest congratulations for having afforded facilities for a display of Fans hitherto unequalled in Melbourne. May this body flourish is my verdict. But I would also like to say here that I hear that they have neglected the big exhibition show, and, after all, that is where the public go. I hope that next year there will be as many Fantails there as are in the North Suburban.

The prizes were very well distributed indeed, but I noticed as most frequently "in the money" Mr. Nixon, who won the Challenge Cup for Homers, while Mr. S. Kirk also did well in that variety. In Saddlebacks Mr. Gus Shee was almost invincible in the feather foots; but a strong team of clean legs was shown by Mr. W. J. Doutch. In Fantails the lion of the show was Mr. C. C. Burton of Branxton N. S. W., who won four first and three specials. Mr. W. Wheeler won the Williamstown Cup for young birds with a slashing white, and also won the cup for any other color. In Jacks Mr. W. Hearne won most prizes, and Mr. Frank Crotty was also a winner, In Magpies the special for best Mag fell to Mr. Gus Walker a novice who showed only one bird. The principal winners were Messrs. Woodward and Mead, and Mr. G. S. Sanderson (Launceston) Mr. Sanderson also did well with Owls. Messrs Searle, Hicks, and Hughes split up the Tumbler sections between them. On the whole the show was an unqualified success. The arrangements were perfect.

Show Homers.

The arrival of the breeding season, which is looked upon as the most interesting period of the pigeon fancier's year, provides a fitting opportunity for a few timely hints to the young aspirant.

Assuming that the decision has been made to venture starting with this highly interesting part of the programme, it will be well to observe the nature of the material at our disposal, both in houses and birds. Quite an array of "don'ts" could be arranged in a set of instructions on this question, but to avoid the monotony of tautology the adoption of another plan will be perhaps of wider interest.

— Housing. —

In choosing a shed for breeding at the early stages a southern aspect is advantageous, and if the sunlight is freely admitted so long as its rays remain the warmth thus obtained gives health and vigour to the birds and encourages them in their duties.

In the event of any stock, cocks more particularly, having been in previous years occupants of certain breeding boxes, arrange, as far as possible, that they again become tenants of such boxes. Much time is thus saved from the invariably tedious task of compelling a bird to take to a box that does not coincide with his views.

Bitter have been the experiences when the absurd idea of overcrowding has been adopted, so devote serious thought to this problem. On the other hand, the one-compartment one-pair system has not found universal favour, since it is acknowledged that the birds, being deprived of each others company, become lost and lazy. From experience, three to four pairs, the latter preferably, in a shed of suitable size, produce the best numerical results, as it tends to give equal rights to each male occupant, and lessens the chance of one becoming "cock of the walk."

— Selecting the Breeding Pairs. —

Selection of stock becomes a most important step, and one that calls for continual thought from the closing scenes of the season that has gone. Take a note of those in stock that have caused trouble the previous season; for example, a clumsy cock that continually breaks the eggs, another that will not feed the young after a week, or one that proves of a vicious nature and vents his spite on the bobies of its young and almost pecks the helpless mite to death, or another that is decidedly unhealthy. Again, hens which lay from the perch, or are clumsy on nest and continually smashing eggs, or are not free breeders. Disregard such stock without exception. Large breeders use these classes of birds sometimes with success by transferring eggs to feeders, but, where the limits are confined to good stock only, this section is best out of sight and mind.

— Type of Breeders. —

Now for a few words on the breeding stock. To obtain an ideal of stock Show Homers your aims are thus directed. Reasonable substance figures prominently in head of cock, stout, well-set beak, nice wattle, with full front. Here is a combination that comprises the ideal of one breeder whose lot can boast success. In addition, there must be a clear white eye, central in setting, with dark, fine cere. Apparently that pictures the model of perfection; but no, length of head is not included, that feature is not required in abundance, but moderation. Throat should not display any signs of thickness, while the body is conspicuous for shortness. The short head is peculiar to a short body, so that difficulty is easily overcome. Not a word has been mentioned on colour, but the more true it is in the male the more likelihood of similarity in the off-spring.

A heavy beak of Antwerp type on a hen is not only undesirable, but ungainly; it does not become the sex from the point of view of those seeking typical and characteristic specimens. This excessive beak substance becomes useful at times, no doubt, but its presence removes that softness of appearance peculiar to hens, and substitutes a decided masculine aspect. In the hen quality is all important not only in head properties and body but in pedigree, and by careful and methodical selection the difficulties become more easily removed relating to the production of the desired features.

— Value of Pedigree. —

In making these selections for stock there is one point of more than ordinary value that must ever be in mind, viz., pedigree. So many purchases are made purely and simply on the value of the bird as it stands to the eye, and the overlooking or, rather, neglecting to examine its pedigree is regarded of little consequence. A good pigeon on this account is often declared a poor stock-getter in the opinion of the uninformed on that point, whereas had a bird with suitable pedigree been mated the result would have determined the same critic in a favourable direction on the results.

— Nesting Material. —

Leaving this question for that of nesting material, let your objections prevail against recommendations to use any unnatural litter and direct thought towards the habits of birds in happy freedom. Twigs from the hedges will always be used by the pigeon enjoying liberty, therefore take advantage of that example from the pages of Nature's book, and supply a liberal amount of short, cut thin twigs scattered about the ground. Broom is capital, on account of its soft and pliable nature. Cuttings from the Weeping Birch are much appreciated, but this expensive material is only at the disposal of a selected few.

Plain sawdust, on account of its labour-saving properties, is used very extensively, but the dangers involved create appalling results. Often has the squab just introduced to the light of day, unfortunately inclined to weakness, been chocked through being compelled to rest its head on the sawdust, which, in a short time, works its way into the little beak, too weak to reject it, with a finale not unexpected.—Feathered World.

(To be continued).

Clear white wattles and hard clean cere are good indications of health.

Home Notes.

Conversation.

People often complain that the company by which they are surrounded is so dull they cannot talk; but if we find the company dull we should blame ourselves. The thing is to touch the right vein in people. One of the chief difficulties to good conversation is to know how to open with strangers. There is nothing better for such occasions than Hazlitt's advice: "If you really want to know whether another person can talk well, begin by saying a good thing yourself, and you will have a right to look for a rejoinder."

Mingle With Others.

If a woman is to protect herself from the ravages of worry, and so retain her youth for a longer period, she must come into more frequent contact with other people—as her husband does—and read good books; she must relieve the monotony of her duties and the limiting influence of confinement within four walls by taking outdoor exercise—a walk every day, or a spin on a bicycle; in short, she must excercise the body and nind in a healthful manner, and she will find the bloom of youth and health remain with her for years after it has faded in other women of the same age. "The ordinary woman," says a celebrated physician, "leads such a monotonous existence that her mind has no occupation but worry; she is almost made up of worry upon worry. What she needs is to come out of herself much more than she does. She must have intercourse with more people and take more excercise. This can be done without neglecting home, and every right-minded man will do his best to secure for his mother, or his sister, or his wife, these aids to the retention of youthfulness of body and mind."

Disordered digestion in adults is often the outcome of being compelled or allowed to eat rich food in childhood.

Physicians are advocating the use of pure olive oil for weak lungs. It bids fair to take the place of cod liver oil, and it is thought by many pleasanter to take.

To clean wall paper, use bread about a day old. If the paper is only dusty, flick and rub it with a mop. If it is marked with grease hold a piece of blotting paper over the spot with a hot flat-iron for a few seconds.

How to Walk Gracefully.

A FEW HINTS GIVEN A FRENCH SPECIALIST.

"The one great fault in your English girls," said the proprietress of a large school of deportment in Paris recently to the writer, "is that they walk too stiffly and take far to long a stride. In my opinion the women of Spain, and Italy are by far the most graceful walkers in the world—and why? Because they are accustomed to carrying weights on their heads. The Parisian girls also are very graceful walkers, on account, I put it down, of the large number of deportment schools which have been opened during the last ten years."

".How do you teach the young ladies who attend your school, madame, to walk gracefully?" I asked.

"Ah, monieur wants to know too much," she replied; "but still, I do not mind telling him a little. When a young lady first enters my school she has to practise walking straight with a weight placed upon her head, and without letting it fall off. When she is able to do this she must then learn to turn backwards, and from side to side. Also, she must practise waltzing with a weight upon her head, and then, after she is efficient in this, she is shown something a little more intricate. When practising walking with a weight upon your head, which is the most important point of all, it should be done before a large toilet glass, so that ladies may study their walk and note all their little defects.

"Another good way to become a graceful walker is to take lessons in dancing, as a really good dancer has a much greater chance of becoming graceful in her walking than a poor dancer. After a lesson in dancing, a young lady should go home and practise what she has been told before a toilet glass, and then walk for about a quarter of an hour round the room with a weight upon her head.

"It is a little known fact, but true for all that," continued madam, "that more courtship are begun at the wells of Italy than in any other part of that country, because that is where the girls are seen to advantage. They go to the wells to get water; and, after getting it, they place the jars on their heads and carry them away with a grace given only to Italian girls; and the the young men, knowing this, congregate round the wells, and of course, the most graceful girls among the water-carriers have the most admirers, and so have the best chance of securing husbands. My advice to you English girls is this: A pretty walk is a beauty in itself, and everyone who will can acquire this beauty, so do it at once now, without losing another day."

General Hints.

— Diet Versus Medicine. —

Medicine is too cheap nowadays, or, at least, we take too much of it. If it cost us more we should take less, trying to find out means of curing little ailments without flying to the chemist. For instance, a little attention to daily diet would save many a dose of castor oil and similar medicines, and do us much more good. A glass of cold water is often of use if taken directly we get up in the morning; while brown bread, particularly the variety known as wholemeal, is preferable to white. Oatmeal porridge is splendid, and we ought to see that it is always ready for the breakfast table. Vegetables, except potatoes, should in these cases be freely indulged in; and fruits, especially prunes and apples; while regular excercise in the open air is a necessity, if we would save ourselves the taking of purgatives.

— If Your Clothes catch Fire. —

Do not run about and scream, but sink on the floor and roll yourself up in a hearthrug, if there is one, or the flames can often be crushed out at once against the floor, and no further harm incurred than burnt hands. If you see a child or anyone else with their clothes on fire, seize the first heavy woollen thing that comes to hand—a blanket, rug, tablecloth or thick coat. Throw it round the person, drag her to the ground, and crush the fire out. Many of the deaths from burning so often reported would never occur if proper steps were taken immediately to extinguish the flames. It is fatal to move about, for the least current of air will increase the fire.

— An Objectionable Habit. —

A disagreeable trick, and one that children easily fall into, is biting the nails. If not promptly checked it will continue into adult life, and ruin the shape of nails and finger-tips. Extreme nervousness or excitement generally causes the child to bite the nails in the first place, and if not checked it quickly it quickly becomes a habit. Help the child to overcome the nervousness, and, if the fingers still find their way to the mouth, they must be dipped in a solution of something bitter, until the little culprit has learnt better manners. As early as possible teach the child to trim and keep the nails in order and endeavour to make him have a pride in them, which will greatly remove the temptation to bite them.

— Hot Milk as a Stimulant. —

When overcome by bodily fatigue, or suffering with brain exhaustion, no stimulant serves so well the purpose of refreshment and rest, both bodily and mentally, as milk. Make it very hot, and sip it slowly from a glass. Milk should never be taken quickly as this renders it indigestible. Always sip milk, taking five to ten minutes to drink a tumblerful. If milk is swallowed quickly, it enters into the stomach, and then forms in one solid curdled mass, most difficult of digestion. If, however, a glass of milk be sipped, and five minutes at least be taken in drinking it, then, on reaching the stomach, it is so divided that when coagulated, as it must be by the gastric juices, while digestion is going on, instead of being in one hard condensed mass, upon the outside of which only the digestive fluid can act, it is more in the form of a sponge, and in and out of the entire bulk the gastric juices can play.

— Glycerine a Cure for Dyspepsia. —

This is a very simple remedy, and one so inexpensive that it is within reach of all. Mix a small teaspoonful of pure glycerine in half a wineglassful of water, and take it with, or immediately after each meal until the enemy is routed, which, is an ordinary case, will be in a few days, and in obstinate cases probably a fortnight. This same treatment should be repeated if indigestion again manifests itself.

Husband (reading the paper): "What idiots some men will make of themselves!" Wife: "Now, John, what have you done this time?"

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide. Telephone, 1234.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

The Science of Watering Gardens.

Many amateurs fail because they do not know how and when to water their gardens; hence this offer of my practical experience.

Bog plants and semi-aquatics requiring excess of water, also plants which grow on dry rocky ground are not referred to in the following remarks.

Good drainage is a first essential to carry off any excess of water. Sufficient humus acts as a storehouse giving off water to the roots without injuring them. A proper amount of stone, sand and grit is required to keep the soil particles from clogging into lumps too hard for the roots and atmosphere to penetrate. Surface tillage keeps a layer of fine soil (instead of a hard cake of earth) and is a means of aerating the ground and conserving its moisture instead of wasting it.

Water is required, firstly, to supply the plant with those juices in the sap which circulate the food it moistens and absorbs from the ground. Secondly, it is needed to dissolve the mineral and earthy particles which otherwise would be unavailable for feeding the plant. Thirdly, water is necessary in order to provide for the transpiration of water from the leaves which is a necessity for their well-being.

Frequent sprinklings cake the surface and make it mossy thus preventing the atmosphere from penetrating the ground. How absurd it is, too, to suppose that a fine sprinkling can do for the plant in a few minutes that which Nature does with hours of soaking rain.

A good, soaking once or twice a week will store up sufficient water for the use of the plants. We see Nature does this, and that she leaves plants for a long time without renewing supplies, and they thrive on it. The amount of water required depends upon the kind, age, position, development, and health of the plant; also upon the season of the year. Succulent and thin-leaved plants require less water than other kinds. Except rapidly growing herbaceous plants the garden will thrive all the better for occasionally feeling the want of water.

The roots of a plant extend quite as far as the branches, and all this area must be supplied. The amateur usually pours water in a thin stream at the base of the stem, thus leaving the spreading roots to starve. Plants require liberal supplies of water when they are producing new shoots, and sometimes the addition of artificial manure to enable them to build up fresh growth properly. Except during their resting time, one cannot run any risk by watering rapidly growing herbaceous plants freely.

Water sparingly when the new shoots are developed, or the plants will grow on freely without forming flower buds. All plants have a period of rest, during which some require very little water, and others none at all.

At short intervals either hose or spray (according to the kind of plant) the leaves and stems, not only to clear away insects, but also to remove the dust which chokes the pores of the leaves.

By enquiry from practical men and by personal observation one may extend these few hints, and thus make the garden a thing of joy and beauty.

Variegated Ficus Elastica.

The bane of plants kept in the dwelling-house is the dry atmosphere, and the dust which settles on the leaves. To counteract this they should be thoroughly sponged once a week in tepid water. Drawing the finger across the leaves will leave a districts impression in the layer of dust, which, chokes up the pores the plants dying prematurely. Cold currents of air should be avoided, and no more water be given than is absolutely necessary. A feature in their beauty is that large specimens of about 3 ft. high can be grown in a five or six inch pot, but in such cases food must be given, especially during the spring months; also, when repotting, it is generally necessary to place the plants in the greenhouse to recover the check, as it is like the Aspidistra, and does not recover quickly after a disturbance.

The Ficus is a little difficult to propagate, but those wishing to increase their stock should fix on a plant of about one or two years old, as the older the plant the more difficult to propagate. After securing a good stem, cut it up into lengths of about two inches, leaving about the same amount of wood at the top with a pair of leaves, as the top shoot-forms a good plant. Insert these into pans of sandy soil, and plunge into a gentle bottom heat under glass.

Pedestrian: "Hey! You just missed me by an inch." Chauffer: "Be patient. I'm coming back directly!"

Salt on the Tail of an Idea.

Read before the Florists' Club of Philadephia.

With your kind permission I am going to tell you to-night how I put "salt on the tail of an idea." We all know success is the result of hard work, no luck in it, simply getting right down to it and hammering away at it ; not only hard work but energy directed in the proper channels, focussed in one direction, concentrated until it crystalizes into Success.

— Ideas are Crystalized Thoughts.

So it is with Ideas. First you see or hear, then you Think, then you Remember, then you Imagine. If you drop either of the four after you have seen or heard, you will Never have an idea. Ideas are crystalized thoughts, and you will not have ideas unless you see or hear. Lots of people see things but do not see. To get ideas we must first cultivate our power of observation ; for instance—I want to get a new wagon, I do not know what I want ; but I do know I want something smart and different from anything about town. I start the observation car agoing, and every fine wagon that goes by me I notice. I see wagons everywhere, partly unconsciously. Then I start the thinkery agoing, and I think about what I have seen, then I remember through thinking about them, then after thinking and remembering what I have seen I start the imagination factory agoing. Oh ! I will get all kinds of crazy notions in my head, but gradually I will have to sift them out one by one, and may settle on one shape or style, but the Idea is not yet clear. Now I have to work harder I have to get a little salt. I drop a little on the tail of that last thought or idea and it becomes a little clearer. Now I throw out a few more fantastic ideas, and in a few more days I have to add a little more salt, and gradually I come to something entirely different and yet practical. You can get this result on any subject if you simply hang to it, and keep on adding salt.

- Creating Ideas. --

Now to create ideas in any specific line it is necessary to surround yourself with the proper environment—the right sort of atmosphere. You will not get sporting ideas in a church, neither will you get moral or religious ideas in a saloon. If your hobby is baseball, and you are a very enthusiastic scorecard man you will not see anything else in the newspaper or on the street but score cards. If automobiles are in mind you will see every new automobile on the road, know all about transmission and gear and the resiliency of the tires. So I am trying to show you how very necessary it is to have the proper environment and atmosphere about you to make a success in any given line. You can draw from it continually, you have something before you to see, to think about, and ta exercise your imaginations upon when you rest at night.

Ah ! gentlemen, this is, I think, the great secret of Ideas — Your outer Office, the eyes and receptive brain, are busy all day seeing things and taking them in, storing them up until you rest. Then your inside office, the subjective brain takes it up, works it out, moulds your thought, your imagination, your enthusiasm into the crystalized product, Ideas.

— Enthusiasm Essential. —

Right here is another important factor I almost forgot to mention, Enthusiasm. It is nigh impossible to take the initiative, to originate anything, to get an idea without enthusiasm. You must believe in yourself, in your goods, and in the appreciation of the general public. I do not care who you are, you are bound to get credit for any really good work or thought you create. Right here I want to tell you about my Surprise Box. The idea was the result of observing and taking up a remark ; a gentleman, a good spender, came into my store, nothing was too good for him, but he was always looking for something better. One evening, after buying a corsage bunch of violets and orchids worth 20,000 dollars, and while I was arranging it in what I thought a very good looking violet box, he leaned over the counter and said, "Why don't some of the florists get up something new in the way of a line box that would present the flowers to the best advantage as soon as it was opened" My ears caught it, I thought about it that evening going home in the car, I don't believe I would have seen a five dollar note on the floor of the car that night. I saw nothing but boxes, boxes, all kinds of boxes. It took fully one year thinking, remembering, imagining to produce the Surprise Box.

While I was experimenting with this the box'maker first of all said I was crazy. "another of these fan-dangled ideas of yours." But I said, "Never mind, you make it this way." "But it will never work," he replied. "Make it" I said, "I will pay for it." I had confidence in my goods, in myself, in the man who wanted something to present the flowers to their best advantage. I first used paper : it would not work as the dampness of the flowers made it soft and limber ; then I used regular doilies, they were too stiff, so I bought lace and had them made our own style and it worked perfectly. I sent the first ones to a few prominent people and they have been friends and customers ever since. I had confidence in the public, I was enthusiastic about it and told them so and they became enthusiastic too and bought them.

— About Flower Boxes. —

Speaking of boxes :—I have just brought a few with me to demonstrate the evolution of the florists' boxes. When I first began my experience in the business, every now and again my boss would say, "Charlie, run up to the shoe store and see if they have any boxes for us. If they haven't go across the street to McCreary's and get some collar and shirt boxes." I can well remember what acrobats those carnations and roses were ; they had to bend the crab, and do every other stunt, squeezed in tight as in a coffin. Then after I got a lot of boxes I had a steady job pasting on our labels over the shoe merchant's.

After this we had boxes made with nice green paper and gold trimming. Once in a while we would change to yellow with white labels. Then the ever-handy cheap folding boxes came into use. When the board got wet the string would cut through and hold the flowers to the lid. At last we had boxes made in different sizes to suit goods, all but American Beauties. You can to-day see fine Beauties coming out of fine shops with the stems sticking out as long as the box itself. What right has a florist to send roses out in this style? Would a dry goods merchant do it? Can you think of any other line that would? It is the first impression that counts every time especially in our business you can't command a price if you yourself do not value the goods worth a decent box.

Ideas are always created through a desire for something: Think, Remember. Imagine. First you think about what is wanted. You see things suggestive. You remember them, you build on them, you imagine; put on a little more salt and you create.

— A Need Must Precede an Idea. —

We had a lot of one-sided begonias, then the thought came, "'what can I do to enhance the value of these plants to sell them at a good profit? " Mats were old, heavy and unsuited to the plant. They needed some kind of a crazy basket to hide the defects. I walked through the supply houses but couldn't find anything to suit. Must make it myself. I am not a basket maker, but here she goes; got a basket maker to make a skeleton and we did the rest; here is your plant worth four times the price in the basket and something new in the bargain. But it took enthusiasm, thought, confidence in the goods, in ourselves, in the public to create it. In creating ideas you will get lots that are not practical and that may be ridiculous or fantastic. But they are divided into two distinct classes easily defined and I have always found this is a good rule to observe:—An idea is only a genuine idea when it conveys your thought and your thought should come from some useful want or desire; there must be an excuse for doing it or twisting a shape in a certain way. It must express that thought to your customer without any explanation from you then you have a genuine idea worth having.

— The Misuse of Ribbon. —

I believe the use of ribbons with flowers has a great field and enhances the beauty and value of them. Remember that last suggestion, "value." A bunch or basket with an appropriate bow artistically placed makes it worth as much again, if you are not simply selling merchandise. But, put the ribbon where it belongs, where the eye suggests the need of something being tied. To put a red neckite on an araucaria is as bad taste as chiffoning an caria is as bad taste as chiffoning an azalea. It does not do the azalea any good and wasts the ribbon. You can use some receptacle with the plant that offers an excuse to tie on a bow of ribbon and you at once have the satisfying effect on the eye. Lots of people will notice these defects but not really know what it is that does not appeal to them. They may buy them, but it will not have that satisfying effect on them as something that conveys and carries out the thought they have.

— Plant Decorations. —

Take up the matter of plant decorations: I remember how it impressed me when a boy starting in the business. The word decoration carried with it the thought of one half day's hustle and bustle, the tearing out of the well-arranged greenhouse, breaking of pots, freezing of plants, and then the next day everything repeated. bringing them home. And all this for about as much as a tailor would charge for a good suit of clothes. The reason for this is, we sell our brains by the load, so much a load, plants, brains and work thrown in and get them all back again the next day. This idea of getting them back again is so impressed on the public that you will not get a good price for your flowers and work because you sell them by the load and get them all back. Sell them something they will keep; you do not want them back, and your customer will be satisfied to pay your price. It is the mental law of sale, something they will get for their money, belongs to them and which they have the desire to possess. Do not take it away the next day by the load. Pack up cut flowers, use them everywhere, they can be used to good advantage in vases, clusters and garlands. Now I do not wish to be misconstrued; we do not want to eliminate plants altogether; we always want to use plants but let them be specimens, plants that you can set anywhere on their own merits.

Has it ever occurred to you how incongruous and bad taste it is to fill a house with a lot of stuff you would not otherwise dare show a customer individually? Using pot covers and pedestals that are anything but ornamental to a finely appointed house, removing all the subjects of art and bric-a-brac and building in place banks of plants. Fill vases with cut flowers, arrange them on the mantel and you will get a better price and will not have to take them back the next day.

— Ideas Again. —

You cannot get ideas or produce new things if your surroundings are out of harmony with your soul. You must first get in line with your inner self and nature, then you must radiate that feeling, that sincerity, that enthusiasm to those about you. Create the atmosphere of happiness, advance good cheer around your assistants, elevate their thought and standing, make them respect themselves, their business and you. Pay them well so they can say with pride "I am a florist," and charge well for your goods and brains. That is the only way to evolve ideas. You, your assistants, your store must be in harmony with the most beautiful things of nature—flowers.

Open Border Notes for September.

The past month has been favorable for gardening, for while there has been an absence of heavy rains, genial showers have fallen, and vegetation has made good headway. This applies especially to weeds and the gardener is under the necessity of bestirring himself to keep them under.

September is one of the busiest months in the flower garden in all districts, for all work which should be completed at once in early localities may be commenced at the end of the month in the later districts.

Nearly everything that is on hand in pot, frame, or box suited to outdoor culture can be planted at once in early localities. Showery days should be chosen for preference, but if rain holds off select cloudy days or cool evenings for this work.

Cannas, Carnations, Verbenas, Penstemons, Ploxes, Pelargoniums, Chrysanthemums, Canterbury Bells, Lobelias, Snapdragons, Gaillardias, Hollyhocks, French Marigolds, Shrubby Calceolarias, Columbines, Marguerite Daisies (white and the blue flowered Marguerite), Agathaea Collestes, Centaureas (including the beautiful Cornflowers), Sunflowers, Iberis of various kinds, and hosts of others of equally easy cultivation, lists of which may be seen in the seedsmen's catalogues, may be set out in the borders.

For all plants, but especially for Cannas, Carnations, and Chrysanthemums, the soil should be well worked up, deep, and free, and well enriched with old manure.

Wherever possible Cannas, Carnations, and Chrysanthemums should be planted in special beds, because the special treatment they require can then be given them.

Cannas can hardly be manured too freely, and must be watered very liberally. North winds and parching dry air are their worst enemies; therefore, make the beds where there is splendid shelter to the north. The south side of a wall or fence is the best position. There are brickfielder days every summer, when they are almost sure to be scorched if planted in the open, unless they can be enveloped in a spray, but they are showy, useful plants.

— Snails and Slugs. —

A keen watch must be kept for snails and slugs. The standard remedy for the former is to collect them early on some morning after a showery night; and for the latter dust with the lime bag at night. If these precautions are followed up with vigor for a couple of weeks there will be a marked diminution of these pests, but intermittent attentions are useless. Some can be poisoned by the use of paris green and bran and syrup, as recommended for caterpillars. Take a dipper of bran, a teaspoonful of Blundel's pure paris green, a cupful of treacle, and enough water to moisten the bran. Mix the treacle and water, and thoroughly damp the bran; then thoroughly rub in the paris green until it is well mixed. Put this in little heaps the size of marbles, or scatter round the beds of plants, and they will eat, and the gardener will be thankful. To kill some and sprinkle them with paris green or arsenic is another plan.

Should pressure of work have caused outlying borders to be neglected and weeds to grow until now, they should be dug up at once before the weeds seed too freely, and unless they are required for immediate planting the surface should not be broken down too finely.

Bedded out Cinerarias must be looked to, and if the weather continues dry regular waterings must be given to enable the display to last longer.

This is a good time to put out evergreen shrubs and hedge plants. Wait for dull or rainy weather, and move carefully, and water at once.

Laurustinus, Veronica, Oleander, Rhamnus, Myrtle, Laurel, Coprosma, Diosma, Citrus, Olea, Eugenia, Arbutus, Tecomas of various sorts, Habrothamnus, Sparmannia, Wigandia, Bougainvillea, Kennedyas, and Passion Flowers should be planted out at once. The creepers prefer warm walls with an eastern or northern aspect.

Palms suited to our climate should now be transplanted. The following are well proved:—Pritchardia filifera, Coryphia australis (fan palm), Sabal umbraculifera, Phoenix reclinata, and dactylifera (Date Palms), Jubaea spectabilis, and Chamaerops excelsa, and humilis. These should not have their roots torn or disturbed in the operation, and must be watered immediately on being set out; in fact, this treatment should be applied to all plants now.

Weeds will be growing apace, and the hoe should be used on bright sunny days as much as possible upon border and path.

In warm pits, in pots, boxes, or pans sow Cyclamen, Gloxinia, Begonia, Coleus, Tydaea, Torenia, Gesnera seeds.

Make cuttings of Fuchsias, Coleus, Pelargoniums, Begonias, Plectranthus, Iresines, in glass frames, a little bottom heat to start them being a great advantage. A fresh manure pit made in the ordinary way is cheap and effective.

Give tuberous-rooted Begonias a start under similar conditions, putting the tubers in small pots at first, and giving them scarcely any water for s start.

A batch of Chrysnathemum cuttings may be put in, but they do not require heat. The strong young top growths about 4 or 5in. long are most suitable. The leaves should be trimmed off half way up the stem, and the cutting inserted to that depth in well-drained pots filled with pure sand. These cuttings should only be occasionally syringed overhead, and not watered to any extent.

Sweet Peas may be sown in cool districts now. For the plains it is best to sow in March, April, or May. Plots are now to be seen about Adelaide in flower, which is good, for there is less danger from hot winds.

The Greenhouse.

Cyclamen, Cinerarias, and Zonale Pelargoniums should make a good show. Pot Fuchsias.

Caladiums should be potted up into convenient sized pots, put in a warm corner, and given a little moisture only. Gloxinias, Achimenes, Tydaeas, Gesneras, St. Paulias may also be started.

If green aphides appear on the plants in the house close all apertures and fumigate with tobacco in the evening. Admit plenty of air during fine days, in the morning more particularly, closing the ventilators fairly early in the evening. As the days become warmer, the time for airing can be extended.

Propagate Crotons, Dracaenas, Anthuriums, and Philodendrons, Impatiens, etc., by short cuttings inserted in bottom heat.

Shake out and divide Cypripediums where finished blooming, and pot up in a mixture of peat or fern fibre Sphagnum moss and potsherds, topping up with Sphagnum around the crown of the roots.

Treat Bromeliaceous plants in a similar manner, and where necersary Marantas could be treated accordingly.

Pot up Rex and other ornamental leafed Begonias into rich, free, peaty soil, in well-drained pots, keep them close to the glass after the shift.

Give all strong-grown plants water, and many of the sorts mentioned above weak liquid manure at intervals as required. Harden off any plants of Iresines, Plectranthus, and Alternanthera used for bedding outdoors.

Prepare to put blinds or frosting upon the roof and sides exposed to the sun, as the plants are very weak in tissue after the dulness of the winter's light.

Removing Faded Flowers.

This is far more important work than most people realise, indeed, some think so little of it that it is scarcely done at all. Yet how much the future vitality and floriferousness of a plant is helped by the continual doing of this simple task, to say nothing of the added neatness the removal of decaying flowers must mean. The following, among others, particularly repay such care: Sweet Peas, Violas, Linums, single Roses, Mignonette, and Verbenas. A strong pair of scissors answers admirably for this purpose.

The Bush-House and Fernery.

Interest in these structures begins to awaken afresh with the sunshine, and plants should all receive an overhaul.

Most plants should be re-potted and foliage cleansed and re-arranged, with the object of making the interior look a little different to what it appeared last year.

Plants that cannot be repotted conveniently, and which are well drained, may be top-dressed with rich compost. This applies chiefly to Tree Ferns, Palms, Cyads, Camelias, etc.

Most small ferns, such a Maidenhairs, require cleaning of old fronds and repotting. They may be divided now, but seedlings that are collected freely from time to time by the observant cultivator from among the pots make far better specimen plants than offsets, growing much more vigorously.

Fern baskets can be filled, and nothing can possibly be more handsome.

Old baskets can be top-dressed with rich compost, and as they grow, weak liquid manure should be applied. This is a better practice for basket ferns than turning and tearing them out.

Fresh peat or soil may be packed into the recesses of rockeries.

Cut old dead fronds from the Tree Ferns and Asparagus plants.

Asparagus Fern.

This elegant plant is far superior to Maiden Hair Fern for its beauty in decorations and for its lasting qualities. The latter, after being made up in a bouquet or buttonhole on a hot day, begins in the course of a few hours to droop, but Asparagus will last as many days and still appear quite fresh.

The best and quickest means of propagation is undoubtedly by taking cuttings, although this method is known only to a small percentage of its lovers.

It is a very easy operation to strike these cuttings. Cut them off just below a joint and insert them in some sandy compost and keep moist and shaded during bright sunshine. In a few weeks' time they will be found to have rooted freely, and if potted up in a compost of peat, leaf-mould and silver sand, will soon make beautiful healthy and bushy plants.

By means of cuttings a large stock of plants can be quickly raised instead of waiting for seed to commence growth. Another good means of propagation is by division. They can also be raised from seed which however takes a long time to germinate. When a pot becomes crammed with roots it should be turned out, all the old soil washed off—not torn of haphazard, thereby destroying most of the tiny fibrous roots—but carefully got away with clear water, the roots afterwards being cut up with a sharp knife and carefully placed in clean pots and new compost. Although this is a good and sure method of propagation, the same quantity of plants cannot be got as by means of cuttings.

It is always advisable to have young plants to replace the old ones, as the latter are of too rank a growth for purposes of effective floral decorations. New growths are always prettier and of finer texture, and for one to keep up his reputation and stock he must propagate by the quickest means.

Asparagus Fern is excellent for a table decoration of for window display. Place the fern in the centre of two or more flowering plants, such as Geraniums, Begonias, Calceolarias, or any other of the bright floral subjects of two or three different colours, and allow the sprays of the Asparagus to droop gracefully over each, about two or three inches above their bloom. The result will provide a particularly effective floral display and one which will prove very attractive to visitors, for its novelty and for its lasting qualities.

How I Made a Garden Roller.

A correspondent to "The Gardening World" writes—"I wanted to roll a gravel path in my garden; an iron roller costs more than I cared to spend for my small requirements, so I procured a two feet length of 12 in. drain pipe, and cut two discs of wood to fit tightly in the ends, filling the pipe with wet clay, rammed tightly as possible, and drove in the wooden discs, fastening them with thin wedges. An iron rod passed through the centre acted as axle, and fastening to the projecting ends two stout sticks (binding with wire) I had a complete roller that has done all the work I needed.

The Sparrow's Appetite.—If you could eat (writes an Exchange) as much in proportion to your size as a sparrow you would need a whole sheep for dinner, a couple of dozen fowls for breakfast, and six turkeys for your evening meal. A tree sparrow has been known to eat 700 grass seeds in a day. (Fortunately we cannot).

Fertilizers and Fertility.

A Paper read before the Society of American Florists. —

(Continued from July Issue).

In speaking of the ferments we are prone to infer that the work is all done by the micro-organisms already referred to, but it seems that still more important in the economy of plant as well as animal life are the unorganized ferments or enzymes. It now seems likely that these enzymes may have an important bearing on the fertilizer question. Just what the nature of these substances may be, at the present time we do not know as it is difficult to collect them in a pure state. That they are highly nitrogenous however, is generally believed. But it is their action which concerns us most. It is said that these ferments bring about changes by their mere presence, or at least without loss of their own substances. That is what is called catalytic action, just as the presence of certain metals in a solution will precipitate other metals.

These enzymes exist in all parts of the active tissues of the plant, and are found in abundance upon the growing point of roots. They evidently have the power of reducing the starches, fats and proteids to forms which can be directly assimilated and used in the building up of tissue. In fact it appears that it is to the work of these enzymes that the bacteria and other simple forms of vegetable life owe their power of rendering up in such a remarkable degree the nitrogen contained in albuminoids and other compounds. The enzymes have been studied principally as they appear within the plant body. They are not themselves organized, and are products, not parts, of the vegetable cell. They can bring about their characteristic changes as well outside as inside the body; and an interesting question is how far these substances may extend outside the plant body, and if it is not possible that in some genera of plants the work of collecting nitrogen from the soil is not due directly to them without the intervention of the fungus.

In discussing the fertility of the soil, there are other factors than the presence of chemical elements necessary for plant food. The food must be accessible, there must be a supply of water for solvent purposes, and there must be a sufficient amount of heat to encourage the action of the dissolving agencies. The physical condition of the soil plays a very important part in determining the fertility of the soil. Air and water are not usually spoken of as fertilizers, but they, nevertheless, are vital to the success of the plant. The soil must be of such character that the air can circulate among the particles and come in contact with the rootlets. The soil must also be in such condition that it will hold a certain amount of water, and it must be of such consistency that the root hairs can visit every little grain of earth in search of nutriment.

The soil must not be so fine as to obstruct the free passage of air and water, nor so coarse as to allow either to flow through in currents. What we need is a happy medium where the spaces between the soil particles are such that a mere film of water encircles every one, or what is called hygroscopic holding of moisture. In this condition the soil is capable of absorbing and holding the greatest possible amount of nutrients in a readily accessible manner. In this condition too it will maintain a more equable temperature and become a more comfortable home for nitrifying bacteria. This physical condition of the soil is brought about by tillage, and it is frequently the case that proper handling of the soil makes all the difference between success and failure.

So much for some of the factors which we have to consider in increasing the fertility of our fields, and now let us consider briefly some of the causes of loss of fertility. We are apt to attribute loss of fertility entirely to absence of available plant food. That such is not always the case will be evident to anyone who has had long experience in gardening operations.

There are failures which are often and perhaps justly attributed to exhaustion of the soil or at least of certain of the elements. The theory is that the land must be rested or a rotation pursued which will allow of a recovery, or a renewal of the missing element. It is such occurrences which have been responsible for our systems of rotation of crops.

The unsatisfactory part of this exhaustion theory is that no matter how much fertilizer we may supply, we can not get certain crops to succeed themselves annually through a long series of years and give satisfactory returns; while certain other crops can be grown annually on the same plot for a generation and increase in fruitfulness from year to year. In looking for an explanation which explains we naturally recall the fact that all living things in the course of their growth use only certain portions of the crude material which is taken into their systems, and reject other portions more or less changing in character. These rejected, waste or by-products may be thrown off from the organism or packed away in some unoccupied corner. These refuse portions are very poisonous, particularly to the organism which produced it. You will doubtless remember that the bacteria and other microorganisms are notorious in this direction, they not only give off refuse matters which are excessively poisonous to some other forms of life, but in the end destroy the bacteria from whence they came.

These secretions of waste matters have been given the name of ptomaines, and instances of severe illness or even death from the use of ice cream or cheese containing these ptomaines will perhaps be more or less familiar to you.

Now it is possible that our "Clover Sickness" and other like occurrances are due not to exhaustion but to the presence in the soil of these ptomaine poisons. Perhaps the clover itself may not be the direct victim, but the nutrifying bacteria so necessary to the growth of the plant may be killed by their own toxic refuse. If this is true of clover, it may be true of other plants which decline to succeed themselves for any length of time.

In this theory of ptomaines is tenable, we have an explanation of a puzzle. There is of course a great

difference in various plants in the character of their secretions. The Rothamsted experiments showed, if I remember rightly, that wheat could be grown on the same land for at least twenty years and the yield be on the increase.

Some other crops are known to do well year after year in the same soil, a fact well known to gardeners, and I can recall one instance of rye being grown on the same field for twenty successive years without any apparent loss of vigor.

Regarding the behaviour of many of the flower crops which are grown under glass, we have but comparatively few facts available. The general impression is, I think, that they will not do their best unless the soil is entirely renewed each season. Whether this is due to poisoning of the soil or to the exhaustion of some food element, or to a change in the physical character of the soil, has not been determined as far as I am aware. If the loss of fertility of the soil in our ~reenhouse is due to physical changes, it is a serious matter, for it means the removal and renewal of the soil once or twice a year, an operation both laborious and costly. In the broader practice of field work these losses can be more readily corrected, at least we do not have to move our soil to the crops.

We stand in need of more work in the investigation of the losses in oor greenhouse work, and it seems to me that the experiment stations might help us in that direction.

Horticulturists have, it is true, done a great deal of experimenting along these lines, but most of the work has not been done in such a manner as to render the results of any great value to the public, nor have there been records kept of the work which are available for study and comparison.

These are some of the factors which we have to consider when attempting to increase the fertility of our gardens. We do not know just what is the best thing to do; we must still experiment a little. Fertilizers do not act just the same every time, but we must continue to use them, and our experience is a pretty good, though often costly guide in their application.

We must remember that fertilizers do not always mean fertility; we need good tillage, good cultivation ann common sense mixed with them.

It seems to me that we stand today upon the threshold of the door which will lead us to a vastly better understanding, not only of the processes of assimilation, but also a more perfect knowledge of the economical production and use of fertilizing elements.

A SUCCESSFUL INSURANCE COMPANY.

Insurance has become one of the routine items of commercial and private life. The question now is, not, shall I insure? but, where shall I insure? People in South Australia have a very wide choice. The Liverpool and London and Globe Insurance Co. Ltd., undertakes practically all classes of insurance work, such as Fire, Accident and Disease, Employers' Liability, Workmen's Compensation, Live Stock, Motor Car, etc. This Corporation handles an immense amount of business in various parts of the world, and has behind it a long and honourable record. Over £56,000,000 have already been paid in claims, which alone is sufficient indication of the wealth and standing of the Company. Agents are stationed in all parts of the State, and in addition the Company has country Inspectors which affords every convenience and facility to farmers and producers in covering risks connected with their particular business. It is, perhaps, not necessary to remind our large circle of readers of the farming and producing community, of the importance of insuring against loss by fire, and the wisdom of asking a wealthy Company to take the risk on their own shoulders, instead of doing it themselves. Many fires occur, destroying buildings, and contents, hay stacks and growing crops, and one never knows when it will not be their turn to be visited by the fire fiend. Perhaps, the reminder that this company undertakes all classes of business will not be inopportune.

Though the prohibitioners may talk and the local optionist may rave, and many other people imagine various things, there is no doubt that the use of stimulants will continue as long as the world goes round. With spirits as with all commodities there are the good and the bad. This is unavoidable, but is certainly unjust to condemn the former for the faults of the latter. There are many brands of wines and spirits which the consumer may use with the fullest confidence and in getting a pure, healthful, and unadulterated article, the "Curlew" Brandy, of which Messrs. Downer & Co. are agents, has stood every test, both of time, as well as medical and analytical examinations. It is largely used in the home, and carries the recommendation of eminent physicians as a desirable stimulant for use in public and private hospitals. The "Curlew" label, therefore, on a bottle may be taken as sufficient guarantee that the contents, are what they are said to be, a good honest article.

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Fruit Garden

Some Troublesome Insects.

— And the Way to deal with them so they will not Bother. —

Cherry, peach, and plum trees are sometimes injured, and often disfigured, by gum oozing from the bark in places. A little gum, here and there, may do no special harm, but often the trouble increases to an extent that calls for treatment.

The gum oozing from the bark of your trees may be from one of three or four causes. It may be

1. Mechanical injury, in which case the best thing to do is to clean away the gum and paint the wound with melted grafting wax or beeswax, or even common house paint, and let Nature take care of it.

2. A fungus disease sometimes called "gummosus," in which case severe pruning back of trees, cultivation, fertilization of soil and watering are about all that can be done, as the purpose should be to stimulate growth. This can not be reached by spraying, as it is beneath the bark.

3. Bark borers or shot-hole borers. These are the larvae of very minute beetles that make tunnels beneath the bark and are also called "engraver beetles." When they mature they bore through the bark and leave holes about the size of those made by gunshot, or about the size of a pin's head. This is why they are called "shot-hole borers." They attack only trees that are declining. There is no way of reaching them in the sense of a remedy, but the best thing to do is to prune back the trees, cultivate the soil, and water abundantly and frequently with water containing a teaspoonful of nitrate of soda in each gallon of water. This is to stimulate growth, and is often successful.

4. The fourth cause of gum is a larger kind of borer, such as is to be seen in peach and plum trees frequently. This can be killed by inserting a soft wire with a sharp point, or by cutting out with a sharp knife, slitting lengthwise rather than crosswise in the bark; or using the best possible remedy for borers, which consists of a liquid called bisulphide of carbon, put into a spring-bottom oil can and injected into the holes the borer occupies. Close up these holes with mud or clay, and the pest will be killed at once and the tree not injured as it might be by cutting.

An American grower writes of the shot-hole borer: I think that we can greatly check this pest by thoroughly washing the bark with a strong soap solution, say one pound whale-oil soap in four gallons of water, to which add one half pint crude carbolic acid. This shot-hole borer spreads quite slowly in an orchard. Keep the trees healthy and thrifty by cultivation and feeding, and it will help much in discouraging the pest. This insect is noticed by small holes which it bores in the bark. There is sometimes a hole for almost each square inch of bark. At these points the sap or wax comes out, in lumps about the size of a grain of wheat. The leaves will drop off the trees when the insect has got fairly started. By examining the holes one finds a small black insect about the size of a flea. When a tree is very badly infested there is usually no hope of saving it. I would burn the tree at once, root and branch.

Keeping Apples.

A correspondent of an exchange recommends amateurs who have late keeping apples to store to put them in drain pipes of 12 inches diameter. The pipes may be placed on end on any hard floor, with a covering on the top to exclude light and vermin. An odd corner of an outhouse will do. The pressure is next to nothing, the temperature varies little, and there is no shrivelling, which is so frequently found in a fruit room.

Bordeaux Mixture.

The Woburn Bordeaux mixture referred to in last issue is discussed as follows in the Agricultural News :—

The eighth report on the work of the Woburn Experiment Fruit Farm, England, deals entirely with insecticides and fungicides, their preparation and uses. Among the investigations carried out at the Station, the results of enquiry into the chemistry of the well-known fungicide Bordeaux mixture has shown how the cost of that mixture may be reduced by three-fifths without in any way diminishing its effectiveness. The following is an extract from the report dealing with this subject :—

The investigation into the nature of the compounds formed by the action of lime on copper sulphate has shown that as many as six different substances may be present in Bordeaux. mixture. The substances which are present when the mixture is made in the ordinary way, by adding excess of lime in the form of milk to copper sulphate, is double basic sulphate of copper and calcium. The carbonic acid of the air acts on this, forming carbonates and sulphates of the metals, and it is owing to the gradual re-formation of sulphate of copper in this way that the mixture possesses fungicidal properties. But the basic sulphate of calcium present is first decomposed before the basic sulphate of copper is attacked, so that a certain time always elapses before the mixture begins to behave as a fungicide. This is a great disadvantage, but can be obviated by using only just sufficient lime to precipitate all the copper in the first instance, for in that case, a precipitate is formed which contains none of the basic calcium sulphate. There is, further, a great advantage in thus reducing the lime used, for the basic copper sulphate precepitated is a less basic compound than that in ordinary Bordeaux mixture, and it liberates two and a half times as much copper sulphate by the subsequent action of the air ; so that a mixture as efficient as the ordinary one may be obtained, with the use of only two-fifths of the quantity of copper sulphate.

To make this mixture, clear lime-water instead of milk of lime, must be used ; 6fb. 6½oz. of copper sulphate are dissolved in water in a wooden pail, and into another large tub of water 2 or 3 fb. of fresh lime are put. After being stirred several times, and allowed to settle, 86 gallons of the clear lime-water are tapped off, and mixed with the copper sulphate, the whole being made up to 100 gallons by the addition of soft water.

The mixture must always be tested to make sure that all the copper has been precipitated, and if this is not so, a little more lime-water must be added, and the testing repeated. If the liquid gives no red colour with potassium ferrocyanide it is in a proper condition for use. The stain produced on a steel knife is often recommended as a test for unprecipatated copper, but it is neither delicate nor safe. Any excess of lime added above the minimum required for the complete precipitation of the copper weakens the mixture, and represents a direct loss of money. The scorching of foliage sometimes noticed after the application of Bordeaux mivture may be caused by the same substance (the copper sulphate liberated) as that which gives it its fungicidal properties, and if so, such scorching is invitable ; it is certainly a fallacy to suppose that it can be avoided by using excess of lime : indeed, it is very probable that the scorching often observed is due to the large excess of lime used.

The mixture made with lime-water as above does not scorch foliage any more than the ordinary mixture, probably less, and has been in constant use in Italy for many years.

Flowering Apples.

From "Horticulture." —

The various ornamental apples included under the popular term "flowering" apples, surpass in floral beauty all trees and shrubs blooming at their particular season. Yet, notwithstanding their great attractiveness, they are used very little as compared with most ornamental plants. This fact is probably due, to a large extent, to a lack of any widespread knowledge or appreciation of their worth. Some have been displaying their beauty in our gardens for a long time, while others are comparatively recent introductions. They are large shrubs or small trees, having a form often somewhat irregular, yet in the case of some specially symmetrical, bearing an abundance of charming flowers with a range in color from white through shades of pink to almost blood-red, and frequently bearing fruit which is attractive in the late summer and autumn.

— As to their Demands. —

They do not require more than the average ornamental shrub or tree and, for the most part, they are not fastidious as regards soil or situation. Some few need garden cultivation, while others succeed in ordinary soil even on somewhat dry banks. However, they all respond earnestly to good deep soil and careful treatment. Moreover, they are perfectly hardy and vigorous. As to pruning, in the early years of the plant's life it is practically identical with that of the fruiting apple, while later it consists essentially in removing dead and interfering branches.

— The Uses to which they may be Put are Many. —

They have their place in the small garden and on the larger estate. Some may be appropriate in the garden or on the lawn as specimens, others may be desirable in the back of the shrubbery, while many of them are particularly well adapted to border plantations and screens. Some as the Wild Crab Apple (Pyrus coronaria), are very attractive when situated on the borders of a natural wood. After all, there is no gainsaying that they are most effective when in masses, especially where there is a background of green, as that offered by a grassy bank or a growth of coniferous trees. Although this larger use seems to be most desirable, the fact should discourage no one from planting them on small areas and in limited numbers, for a single plant in a garden or on a lawn is capable of affording as much pleasure during its season of bloom as any individual plant possibly can.

How unobtrusive the flowers are as they nestle in the fresh living green of the unfolded leaves! Yet how certain they are to catch your attention, and how tenaciously they hold it! Is not their perfume sweet? It is that of the apple, yet more refined and withal more intense and all-pervading.

— The Siberian Crab (Pyrus Baccata). —

Now, is it not worth the while to devote ourselves to making their personal acquaintance? As the Siberian Crab is the first to greet us, it is only courteous to cultivate its friendship. Although growing wild from Siberia and Manchuria to the Himalayas, it has been cultivated in Europe for a long time and in China and Japan from time immemorial. It is a small spreading tree sometimes becoming as large as the apple and reaching a height of thirty feet. The flowers are usually white and appear in abun-

dance with the leaves on long green flower stalks. Following the flowers come the little apples, ranging in size from a quarter to three-quarters of an inch in diameter, and yellow or red in color. When in bloom the tree is a beautiful object, and again at fruiting time it is interesting, yet it should not rank high in this list. What will shortly be said in the case of the Flowering Crab as regards hardiness, vigor and ease of establishment, applies to the Siberian Crab, and likewise the uses to which they may be put are identical.

— The Flowering Crab (Pyrus Floribunda). —

This is an extremely attractive plant from Japan. It is a shrub or small tree, low and bushy in form, branching from near the ground, and ultimately growing to a height of twenty feet. The flowers are rose-colored, an inch across, and completely cover the plant. The slightly loosened buds with their bright red hue are nearly as attractive as the unfolded blooms, and the combination of buds and open flowers is charming. Then follow the small red apples, about the size of a pea, borne on slender stems. These are rather interesting during the late summer and early fall but do not persist until winter. All in all, this is the best of our apples and, in fact, ranks very high among ornamental plants. It is good in a garden, but most effective when used in masses. This is one of the apples very well adapted to forming screens or to use in border plantations. It is hardy, sturdy and easy to establish and grow.

— Parkman's Crab (Pyrus Halliana) —

is a bush or small tree, with loose open crown, somewhat unsymmetrical in habit and as a rule not exceeding a height of fifteen feet. It has pleasing feathery foliage in moderate abundance. The flowers are rose-colored, usually semi-double, pendulous on slender reddish flower stalks. The fruit is about a quarter of an inch in diameter, brownish-red, and ripens in late fall. Although its beauty depends almost entirely on the bloom, it is particularly handsome and as regards delicate modeling and exquisite coloring it is the most charming of the group. It is not as vigorous a grower as most of these plants and is more exacting in its demands if one is to get the most satisfactory results. It is decidedly a plant for a garden or lawn and should not be placed in poor soil or in trying situations.

— The Chinese Flowering Apple (Pyrus Spectabilis) —

is an apple which has been long in cultivation. It is a small shrub-like tree growing under garden cultivation from twenty to twenty-five feet high. The branches are upright in habit of growth, rather symmetrical, and when the plant reaches maturity the form is vase-like. The foliage is of moderate density and the leaves are thick and of a dark green color. However, the foliage has no particular merit and is inferior, as I believe, to that of most of the apples. The flowers of the forms growing in cultivation are semi-double, nearly an inch across when fully expanded, pale rose in color fading to white, and of delightful fragrance. They appear in great profusion each year. Fruit is rarely borne and is of no consequence for ornamental purposes. It is easy to grow and is one of the desirable trees for a small place.

— The Wild Crab Apple (Pyrus Coronaria). —

Of our own native apples the Wild Crab Apple is the best, comparing favorably with the most satisfactory exotic species. It is indigenous to the forest glades of the region south of the Great Lakes and among the Allegheny Mountains. In form it is a low, bushy tree, growing under favorable circumstances to a height of twenty-five or thirty feet, while its branching is characteristically stiff and angular. It is a late bloomer and prolongs the display of apple blossoms, a fact which gives it decided value aside from its other merits. Perhaps it is less showy than most of the members of this group because the leaves have unfolded when the flowers appear. These are white or rose-color, nearly two inches across when fully expanded, and delightfully fragrant. The fruit is about an inch across, waxy, yellowish green, possessing some ornamental value and serving for jellies and preserves. The plant is perfectly hardy, vigorous and easy to grow. It is best used in masses, either in conjunction with others of the flowering apples or with strong growing shrubs or low trees. It could be successfully employed in screen or border plantations, and would be admirably placed when used on the margin of a natural woodland. All in all it is the most meritorious of the apples as well as one of the most desirable of small trees.

Now to assemble the attributes and emphasize the fitness of our old and newly acquired friends. We have found them to be hardy, sturdy and far from exacting in their requirements. Their adaptation to a wide field of usefulness is evident and their fitness to their particular tasks goes without saying, whether it is to gladden a garden or lawn as specimens, to enliven the back-ground of shrubbery, to add cheer to a screen or boundary planting, or to brighten the borders or open glades of some native woodland. Their beauty is beyond portrayal. The rose with its suffused fragrance and its delicate splendor is no rival when their branches arch beneath the many flowers, all modest in the presence of their own wonderful coloring.

Oidium on Vines.

In wet seasons the mildew known as Oodium tuckeri causes considerable drainage among vines, but this loss can be almost entirely avoided by systematic dusting of the plants with flour of sulphur. Some practical remarks on this subject were made at Lyndoch recently by Mr. J. Woolcock, who read the following paper before members of the local agricultural bureau :—Oidium is a mould that grows exclusively on the outer tissues of the vines, and attacks only the green organs of the plant, viz., young shoots, buds, leaves, tendrils, flowers, berries, and stalks. It appears first as a dirty white efflorescence, extending like a thin film, and possessing a characteristic mouldly smell. After the attacked wood has become ripe and hard the imprints of oidium may be seen as dark brown patches on the surface of the bark, which is not gnawed through as in the case of anthracnose or black spot. The wood is liable to dry up in winter, and should never be selected either for cuttings or as scions for grafting. Very often the invasion occurs after blossoming, and in that case it mostly attacks the leaves and bunches. Should it appear early, and unless proper attention is paid in due time, it will cause the flowers to abort. The tender leaves are the first and the most seriously attacked, the disease showing preferably on the under surface. Its mesh-work of microscopic shreds or filaments spread around them, and they soon shrivel and dry up, while their full power as organs of evaporation and of assimilation of some of the constituents of the air is seriously impeded, and the must of grapes coming from affected vines is never so rich as in the case of well-matured and healthy grapes. It is the berry, however, that the fungus seems to most particularly cherish. They are either entirely or partially covered with a whitish greasy powder, which at first can be rubbed off without leaving any trace, but which, after a few days, when the powdery mould has taken a greyish tint, leaves, when rubbed off, little black specks on the surface of the skin. The effect of the fungus on the skin is to tighten it and prevent it from stretching, so that the berries either dry up or burst open. The ripening does not progress satisfactorily; the berries assume a dull and sickly color after they have turned, and are none too good for making wine, as they have a mouldy taste. Oidium, as a rule, flourishes best in localities where the atmosphere is generally warm, moist, and muggy, while it is not so troublesome in a hot and dry climate. Again, some varieties of vines are more susceptible to the disease than others, and the vinegrower should watch in the spring and early summer for possible invasion. All vinegrowers are acquainted with oidium, and a great majority know that sulphur is the best remedy for the pest. A great many, however, may not be aware that there is a form under which sulphur is more active for that purpose, and also that the state of the weather and the time of day when the application is made have

a direct influence upon the efficacy of the remedy. Atmospheric conditions have a considerable influence over the growth of oidium. A warm temperature favors its growth, but great heat, such as when the thermometer rises up to 95 deg. Fahr., stops the progress of the fungus, which actually dies out when the temperature reaches 113 deg. Far., though its debris, when the circumstances become favorable, soon cause a new invasion. It is often noticed, especially in warm districts, where the temperature close to the surface of the soil is very high owing to the radiation of heat, that the lower leaves, as well as the bunches that hang pretty low, are free from the disease, while on high trellises under similar circumstances, it is seen to blight the vine and wither the crop. Experiments conducted in all parts of the world have conclusively demonstrated the action of sulphur against oidium, and powdered sulphur, as well as flour of culphur, is now used everywhere. It is not necessary, moreover, to bring the particles of sulphur into immediate contact with the spores and fungus threads to effect their destruction, as the fumes which this substance in a fine condition emits at elevated temperatures, and especially by exposure to the sun and heat, are the only active agents of destruction of the mould. Under the action of heat the sulphur is oxidised, and sulphurous acid is formed, which is an efficient insecticide and mould destroyer. That action, it has been noticed, is more pronounced when the sky is clear and without clouds than in a diffused light. In places where the temperature of the soil rises as high as 110 deg. Far., spreading the sulphur on the ground under the vines is sufficient to accomplish the destruction of the fungus. Sulphuring, to be efficacious, must be used as a preventive. If the treatment is delayed until the formation of the fruits of the fungus it is not likely to do much good, for, although it may destroy the mycelial threads, the seeds of the fungus are too well protected within their hard coverings to be injured by the application. The best time for sulphuring is early in spring, when the shoots are 4 ins. long; then again just about the time of blossoming, as however well the applications may have been made, it is almost certain that some of the terminal cells of the mycelial threads swollen and filled with a transparent granular matter, will escape destruction. These, with spores brought from other vineyards, may bring a new infection in about three weeks' time. At this period the blossoms may be rendered sterile by the threads of the oidium covering the newly-expanded flowers and causing them to abort. A third application should be made a few days before the turning of the berries. In wet seasons, or in a moist district, as many as five and sometimes six sulphurings may be necessary, and no hard-and-fast rule can be laid down for each application. The person in charge should use his judgment and sulphur more especially the varieties most subject to oidium until the pest has completely disappeared. There are many ways in which it can be applied, i.e., by a piece of branbag held by the four corners and shaken over the vines, a dredging box similar to a flour dredge, or a sulphur bellows. The bellows are most widely used, and most effective, as the operator can get at the underside of the foliage where the disease will appear first. Last season I saw some very bad cases of oidium on vines, and the owners did not know what the trouble was. It was then too late to apply the sulphur with a view of saving the fruit.

Sweet Potatoes.

Under the above title a very useful and interesting pamphlet (Farmers' Bulletin 324) has lately been issued by the United States Department of Agriculture. It contains a good deal of information as to the climatic and soil conditions needed by the sweet potato .rop, the fertilizers that are most suitable, methods of preparing the land and setting out the plants, after-cultivation, harvesting of the produce, different varieties, etc., as well as details in relation to storing the crop.

Sweet potatos thrive best on a moderately fertile, sandy loam, which does not contain an excess of organic matter. Farmers in the Southern States of America put a special value on the crop because it is one that can be grown upon soils which are too poor for the production of the majority of farm crops.

Good drainage is essential for the successful cultivation of sweet potatos. When the soil is too loose the potatos tend to be long and irregular in shape. For this reason it is not advisable to plough more deeply than 6 or 8 inches in preparing the land, since the best shaped potatos are produced in a fairly loose surface soil overlying a firm subsoil.

Abundant application of organic fertilizers has been found to stimulate the growth of the potato vines at the expense of the roots. It is not advisable therefore to apply heavy dressings of farm manure directly to the crop. Such dressings should, in preference, be ploughed into the soil with the crop of the previous season. As a general rule sweet potatoes will pay for judicious manuring with artificial fertilizers. It is recommended that a mixed fertilizer suitable for use on most sweet potato lands should contain from 3 to 6 per cent. of nitrogen, 6 or 7 per cent. of phosphoric acid, and 8 to 10 per cent. of potash. Such a mixture as the following would meet the above requirements: 200 lb. of high-grade sulpate of ammonia, 200 lb. of dried blood, 1,200 lb. of superphosphate, and 400 lb. of high-grade muriate of potash. E2perience has indicated the necessity of having an abundant supply of potash in order to secure the best return with the sweet potato crop. In manuriaf e2periments with the crop, the application of potash has resulted in an increased field of from 40 to 60 per cent. When large quantities of artificial manure are given, it is better to distribute the fertilizer at least ten days before planting and thoroughly to incorporate it with the soil, than to apply it in the row at the time the crop is being planted. Sweet potator are regularly propagated by vine cuttings from which the next crop is is raised from 'seed' potatos, which are in some cases cut in several pieces, and planted in the row where the plants are to mature, or more frequently, allowed to sprout and grow for some time in the soil, and the vines so produced, taken and divided into cuttings from which the next crop is obtained. Propagation by vine cuttings is, of course, as a general rule, cheaper and more convenient, but the results of experiments have shown that it is advisable occasionally to have recourse to planting 'seed' potatos, since the crop certainly tends to fall off in yield when reproduced from vine cuttings only, year after year in succession.

Small potatoes only need be used for planting purposes, or for the production of vine cuttings. They should, however, be uniform in size, and of the shape desired in the following crop,

Land that is best suited for sweet potatos growing is easy to cultivate, and thorough preparation of the soil will be repaid by increased return, and greater ease in handling the crop later. Sweet potatos can well be grown in a rotation which includes cotton and a green forage, crop, such a cowpeas, beans, etc.

In many parts of the Southern States sweet potatos are grown on land in the level condition, which has not been raised into hills. The vine cuttings or young plants are set out about 24 to 30 inches apart each way, so that from 7,000 to 11,00 plants are required per acre. Where the crop is grown on ridges, or hills, it is customary to have the ridges, from 36 to 42 inches apart, from centre to centre, and to place the plants 14 to 18 inches apart in the rows. It is always well to plant the crop when the conditions are most suitable to a quick start into growth, either just before a rain, or as soon afterwards as the land can be worked, since the sweet potato plant is one which responds readily to a moist condition of the soil.

After-cultivation of the crop consists chiefly in hoeing for the purpose of maintaining a mulch of loose surface soil, and for keeping down weeds. This surface cultivation should receive attention, more especially when the soil is drying after showers of rain, since at that time the upper layer tends to cake.—"Agricultural News."

PROPAGATION OF SWEET POTATOES.

In a later issue we read that in order to desmonstrate the advisability of occasionally having recourse to the tuber in the propagation of sweet potatos, and the bad economy of continuing, year after year, to plant vine cuttings from crops which have been themselves grown fron vine cuttings, some trials were carried out at one of the Cuban Experiment Stations.

In these tests, sweet potatos of the same variety were grown on adjacent plots which received identical treatment in all respects. In one case, however, the crop was grown from vine cuttings which had been raised in this way continuously for many generations, while in the second case planting was made with slips grown directly from potatos themselves. The plots planted with slips returned a crop three and a half times as great as the plots planted with cuttings. It is evident that the gain of 350 per cent. fully repaid the extra expense and trouble involved.

Nitrogen as a Plant Food.

No plant food is of more importance than nitrogen, since this is the element removed from the soil in largest quantity by the great majority of crops. The available supply of nitrogen in most soils, too, is very readily exhausted by continuous crop growing, and it is the most costly of manurial elements to replace. As most planters are aware, an economical method of increasing the store of nitrogen in the soil is by including in the rotation an occasional crop of leguminous plants, such as cow peas, velvet beans, ground nuts, etc., which thus serves a double purpise. The following notes dealing with the subject of nitrogen as a plant food, are taken from a lengthy article entitled 'Relation of Nutrition to the Health of Plants,' that appeared in the Yearbook of the United States Department of Agriculture :—

Nitrogen is an important constituent both of plant and animal food. It is essential to the formation of albuminoids and of various constituents of the protoplasm or

living substance of the plant. By far the most important source of nitrogen for most agricultural crops under ordinary circumstances, is the nitrates of the soil. The main source of nitrogen in the soil, besides the decay of organic matter, is the fixation of the nitrogen of the atmosphere through the agency of micro-organisms. Though about 75 per cent. of the volume of the air is nitrogen, it does not become available to ordinary crops. In the case of leguminous crops, however, nitrogen is absorbed by micro- organisms, and converted into nitrates or some other high nitrogen compound which can then be utilized as plant food by the growing crop. Many varieties of bacteria and fungi have been found which can absorb free nitrogen if they are furnished with carbohydrate food. This is usually derived from decomposing vegetable matter or from living root cells. The bacteria live on, or in, the roots of the leguminous plants, forming swellings or tubercles on them. The great importance of this to agriculture is at once apparent, and the study of the conditions favouring the growth of these beneficial mico-organisms is of the highest practical value.

The lack of a sufficient supply of nitrogen to growing plants is usually manifested by reduced leaf and stem growth on the part of the crop, and a tendency to the production of flowers and fruit at a very early period, though the amount of fruit produced is correspondingly small. In this respect the effect of a lack of nitrogen is similar to that of a lack of water. On the other hand, an excess of nitrogen acts like an excess of water, stimulating the production of vegetative growth at the expense of flowers and fruit. This growth is rich in nitrogenous matter and water, and is very easily injured by unfavourable conditions. It is a well- known fact, for example, that many cereal crops have not only soft leaves and weak stems under such conditions, but the plants are more subject to rust and mildew, and various other parasitic diseases. This is true, not only of cereals, but practically of all ordinary plants. In culture under glass these conditions can be controlled and remedied, but in the field it is more difficult. Drainage and methods of cultivation also in a measure afford means of check to rapid and succulent growth in wet seasons.

Besides these general effects of the lack or excess of nitrogen on growth, attention should be directed to some obscure diseases where nitrogen assimilation appears to be involved. Among these may be mentioned 'mosaic' disease of tobacco, winter blight of tomatos, 'die back' of the orange, and California vine disease. As already stated, plants obtain most of their nitrogen through the absorption of nitrates by the roots. The dilute solutions pass up through the stem to the leaves, where, through the aid of the chlorophyll, the nitric acid unites with sugars to form the more highly organized nitrogen compounds such as amides and proteids, which serve as food for the growing cells. the young cells cannot use the original soil nitrates any more than animals can, so that if anything interferes with the process of proteid organization, nitrogen starvation will follow, even in the presence of large quantities of nitrate. For the organization of proteids, sugars are required, and sugar cannot be produced unless the chloroplasts are in good working order, and exposed to light and heat of the proper intensity. The proper mineral nutrients — lime, potash, phosphoric acid, magnesium, iron, etc., must always be present. With insufficient light or heat there is no proteid formation from nitrates, neither is there any in albino leaves or those devoid of chlorophyll. In both of these cases, therefore, nitrates accumulate in the plant. With the renewal of the activity of the chloroplasts the accumulation of nitrates is gradually worked up into proteids, except, of course, in albino leaves, where the chloroplasts may have permanently lost their functional activity. In such cases the cells usually remain comparatively rich in nitrates.

It is known from experimental investigation that a large excess in nitrates may in itself cause a yellowing in the assimilation. At first, plants overfed with nitrate of soda, or other strong nitrogenous fertilizer, become a brighter green and grow rapidly, but as the nitrates accumulate in the cells faster than it is used, the leaves begin to turn yellow on the edges and along the vascular bundles, growth is checked and the plant dies back. This is especially likely to happen in the case of crops that are not gross feeders. Yellowing and death of the edges of leaves (though not following a stimulated growth) is caused by an over-application of almost any quickly soluble salt (potash, sodium chloride, etc.). In the case of the orange, it has been observed that the disease known as 'die back' appears to be greatly favoured, if not caused, by excessive fertilization with organic manures rich in nitrogen. It is not known whether nitrogen from mineral fertilizers has the same effect.

Webber also observes that on the poor sandy soils of Florida, sulphate of ammonia and nitrate of soda stimulate not only vegetative growth of the orange, but the production of fruit as well, while organic manures are more likely to stimulate vegetable growth at the expense of fruit, the fruit produced with organic nitrogen being coarser, thicker skinned, and of poorer quality than when mineral fertilizers are used. Farm manure acts in this way like organic manures, as might be expected.—"Agricultural News."

Vegetable Garden.

Notes for September.

Spring work now commences in earnest everywhere. In the earlier districts, of course, it commenced in August, and many things are well advanced, such as early tomatoes, early cucumbers, and so on; but, if things be done properly, the man who starts now will not be far behind the one who went to work in the wet weather. It is little use sowing cucumbers or tomatoes or melons in the open till the end of the month. But if the bed be well prepared and plenty of suitable manure put underneath, forming a mild hot-bed, seeds planted at once will germinate, and get a good start. Of course, early tomato plants should be now ready for planting out. If you have not got any ready, it is advisable to buy a few plants from the nurserymen.

I have frequently written about the advantage, or shall I say absolute necessity of properly preparing the ground for all crops, but I cannot refrain from again emphasising this most important point. I would sooner have one cucumber plant on a well prepared bed than a dozen put in carelessly, and the same applies to other vegetables. For the home garden my advice is, grow a few plants and grow them well. You will thus get more pleasure and better results with very much less work. The advice applies with double force in a market garden.

If not already done, make a sowing of French beans in early districts as quickly as possible after reading these notes. Work the ground well, manure it well, raise it well above the surrounding bed to get drainage and warmth, and you should have French beans in November.

For the early beds of French beans try and choose a sunny spot, and not only raise the bed slightly above the surrounding surface, but, if possible, slope it towards the north.

Make sowings of red and white beet, spinach, capsicums, New Zealand spinach, tomatoes, cucumbers, sweet and water melons, marrows, pumpkins, trombones, sugar maize, radishes, lettuce, turnips, mustard, and cress, etc.

In the early districts make a final planting of cabbages, onions, and potatoes, and in late districts, on well drained soil, make the first planting of these same vegetables. Plant sweet potatoes where the conditions are suitable. These are a sandy soil and sufficient summer moisture. The sweet potato should become a very popular vegetable in South Australia, for which both soil and climate in very many places are suitable.

Keep down the weeds; keep the soil moving and light. It does not matter so much about earthing up potatoes, but it does matter about keeping the soil loose, and, if the potatoes are inclined to be near the surface, then they should either be mulched or earthed up.

Don't forget a bed of sweet corn, this most neglected and most delicious of summer vegetables. This, again, is a vegetable which should be very largely grown where water is available.

It is too late for peas and broad beans in the early districts, but in late districts crops should be sown freely. In later districts cabbages, cauliflowers, and celery will be transplanted from now onwards. The onion crop will be put out, and at the end of the month the first sowings of French beans, capsicums, tomatoes, cucumbers may be sown in warmer localities, but October will be soon enough in many places.

Storing Lemons.

Lemons for storing should be cut from the tree, not pulled, and handled as carefully as eggs; they should be gathered just as they are becoming yellow and ripe. After picking, they should be allowed to stand well exposed in some building, until the surplus moisture has evaporated from the skin, and the latter has become toughened. This may take from five to ten days, according to the weather. The sun should not be allowed to shine on them after they are taken to the store room. The air should never be allowed to strike any of the fruit when once it is stored away, so that it is necessary to stack the fruit close together in the centre of the room, leaving just room enough to walk around. Old bags may be hung around the sides of the stacks, then the tops of all stacks of cases should be covered with boards or trays, after the fruit has been covered with bags, so that neither light nor currents of air may find their way into the fruit. The cases should be lined with paper, and, if each individual fruit is wrapped in soft paper, so much the better.—"Exchange."

Prospective Purchaser — "You say this is a healthy place, yet the man next door is confined to his bed. How do you account for that?" House Agent—"Oh, he's a doctor and is slowly dying of starvation."

Pollination of Tomatoes.

The question of the pollination tomatos has been undergoing investigation at a number of Experiment Stations in the United tates, and the results obtained e distinctly interesting. The report on the work done is summarized as follows in Farmers' ulletin 317 of the United States epartment of Agriculture :—

As far back as 1890-1 it was und at the Cornell Station that the amount of pollen used in fertilization of the tomato flower had an important influence on the form and size of the fruit produced. More recently these results have been confirmed at the Michigan Station, where it has also been shown that no decided advantage was gained by the cross-pollination of varieties as compared with self-pollination. Four plants of each of six varieties were employed to determine the effects of using varying amounts of pollen. All the flowers on one plant of each variety were emasculated and pollinated on one side of the stigma only. These invariably produced lopsided and small fruits. All the flowers on one plant of each varisty were pollinated with from one to five pollen grains. These produced very small solid fruits, with an average weight of about 1 oz., and having no seeds, or but one or two. All the flowers on one plant of each variety were pollinated with a large amount of pollen, spread all over the stigma. These produced fruits that were smother and heavier than those produced from flowers that received but a small amount of pollen. The conclusions deduced from these experiments are that when pollen falls on one side of the stigma only, a one sides tomato always results, and the larger the sigma the greater the irregularity. The amount of pollen applied determines to a great extent the size, and smoothness of the tomato, but after a certain amount no further increase can be obtained. The small, irregular tomatos grown under glass are caused largely by insufficient pollination.

With a view to throwing some light on the relative value of cross and self-pollination, the blossoms of four plants of each variety were cross-pollinated with two other varieties. All set fruit equally well. The 265 fruits produced from cross-pollination on all six varieties had an average weight of 79.1 grammes. There was, therefore, practically no gain in the total number of cross-pollinated fruits, but a slight gain in weight. Although it does not appear necessary to raise several varieties for the purpose of cross-pollination, there is no harm in alternating such varieties as are grown, and in some cases a possible benefit, such as a slight increase in weight may be obtained. All the experiments, however, show that the setting of a good crop of smooth, heavy fruit depends largely on the distribution of the pollen.—"Agricultural News."

The Black Currant.

This is quite a distinct fruit from the red or white currant, and requires an entirely different mode of treatment. It succeeds best in rich, moist soil, thriving well in a cool, somewhat shaded position. A thorough preparation of the land before planting, by either bastard trenching or ploughing and subsoiling, is essential. Although delighting in an abundance of moisture, the black currant will not thrive in a waterlogged soil, the roots being des-tr---d by too much water. Therefore in wet situations draining is necessary. The black currant being a gross feeder, an abundance of plant food is required to produce fruit of the finest quality. Farmyard manure, where procurable at a reasonable cost, is to be preferred, but where it is necessary to apply a special fertiliser, this should be rich in nitrogen and potash. As it is also a fibrous surface-rooting bush, digging or deep cultivation of the ground after planting must be avoided; hoeing and surface-tilling only being necessary, to destroy weeds and keep a loose friable surface. Fertilizers should be applied, as a mulch only, and where artificial manure is used it should be lightly cultivated in.

The black currant is easily propagated by cuttings. These should be made about 12ins. long, cutting the lower end square off close to a bud, also cutting off the top to make them branch out. Cuttings may be made from a healthy one-year-old shoot any time after the fall of the leaf. None of the buds should be removed. They should then be planted in rows 18ins. or so apart, a few inches from cutting to cutting, and about 8ins. deep. Three or four of the uppermost buds will then start into growth in the spring, and by the following autumn should have produced shoots from 12ins. to 18ins. long. These one-year-old bushes should be removed and planted in their permanent positions, 5ft. apart on the square being the minimum distance. This must be regulated by the method of cultivation intended. When the planting is finished, cut the branches well back, leaving but three or four buds at the base of each shoot: this will cause a vigorous growth of healthy young wood for the following season. All the pruning necessary for the second season after planting will be thinning out where branches are crowded, leaving the centre of the bush fairly open. Do not shorten back any of the branches left.

Since the black currant produces its finest fruit on the new wood—that is to say, wood of the previous year's growth—not on spurs, it must be the aim of the cultivator to keep his trees well furnished with this description of wood. To do this it is necessary, when pruning, after the bushes are established, to cut out the old wood that has produced a crop, to make room for the young growth. In removing the old wood cut well back to a healthy bud, which will develop into a shoot or branch to carry a crop of fruit the following season. Always leave the strongest and healthiest of the young wood to bear the crop, cutting out the weakly growths, finally leaving the branches five or six inches apart. If this system is properly carried out black currants will continue to produce heavy crops of fine fruit for many years.

An advantage to be gained from leaving all the buds when making the cuttings is that, as the bushes get older, suckers are sent up from the base, and, as the best fruit is produced on young wood, these suckers are beneficial; all that is necessary when pruning is a judicious thinning-out of the same to prevent crowding.

An additional advantage in districts where the borer is prevalent is the abundance of young wood, enabling the grower to cut out almost all the two-year-old wood, besides leaving plenty of young wood to select from; thus he is able to overcome to a great extent the ravages of this pernicious pest.—New Zealand Journal.

Keeping Fruit.

Although many of the experiments that have been made at different times with a view to prolonging the keeping qualities o fresh fruit have not proved to b all that may be desired from a commercial standpoint, yet man of them are of value. It has bee shown beyond doubt that th decay of ripe fruit is generally du to the presence of bacteria on th outer surface of the fruit. With a view to destroying these agent the use of formalin has frequentl been resorted to, and althoug often used at various strengths, i is no doubt beneficial in extendin the period over which the rip fruit may be preserved. Recen experiments at the Kew labora tory (London) have partly dete mined the length of duration ove which some of the smaller fruit and berries may be kept in goo condition. A number of goos berries were recently immersed fc ten minutes in cold water contai ing 7 per cent. of commercial fo malin, after removal they we placed in ordinary fresh water fc five minutes before being place on wire-netting trays to dry. Tl fruit was purchased through tl ordinary channels of distributic from a retail shop, and, althoug it was perfectly ripe at the tim it was found that it kept in goc condition for from four to seve days after similar fruit purchas at the same time had decaye Strawberries and grapes immers in the solution were kept in pe fectly sound condition for fo days after the untreated fruit ha become mouldy. Cherries ar gooseberries remain firm for seve days longer than untreated frui Other experiments conducted at t same time showed that, while th had a beneficial effect upon t fruit, they were by no means effective in prolonging the keepi power of the specimens treate and also that the cost of trea ment by means of the formal solution was very considerably le than by other methods.

The Farm

Rhodes Grass.

The name Rhodes grass has been applied to at least two members of the Chloris family, which has led to much confusion both among botanists and those who have given these two grasses practical trials in Cape Colony and New South Wales. Even Mr. J. H. Maiden, Government botanist for New South Wales, fell into error, and for nearly a couple of years used the popular name of Rhodes grass for Chloris virgata. Personally, I think the confusion in the names was in a great measure brought about by the fact that the late Mr. Cecil Rhodes, who took a keen interest in the introduction of new species of grasses and in agriculture generally, had seeds of the Sweet grass of the Tranvaal collected and sown in large patches on his estate, "Groote Schur," near Capetown. The grass did well there, forming heavy sods of good herbage, and the manager of the estate had the seed collected and distributed among the planters of Cape Colony, by whom it was naturally called Rhodes grass. However that may be, it is now generally accepted that the botanical name of Rhodes grass is Chloris gayana, while Chloris virgata is applied to the Zoet or Sweet grass of the Transvaal. A considerable amount of seed has been sold in Australia under the general name of Rhodes grass, and taking into consideration the confusion that has existed in regard to nomenclature, it woold be a hard matter without a botanical examination to say whether such seed is in reality C. gayana or C. virgata.

The whole of the Chloris family delight in a warm climate, and may be found through the tropics in both hemispheres so that it is doubtful if either of the two species under discussion would thrive in any but the warmer portions of this country.

Rhodes grass was first introduced into New South Wales six years ago by Mr. Sylvester Brown, of Minembah near Singleton. He raised a vigorous plot of it on his own property, and besides freely distributing seeds, according to Mr. Maiden, sold large quantities of it under the name of Chloris abyssinica. The Singleton district, it may be remarked, is not a place of high rainfall, and is considered rather cold in winter.

For the benefit of those who are unacquainted with it, I must state that Rhodes grass is a hardy perennial of high feeding value, which on fairly moist land makes a rapid growth of five or six feet in summer. Its stems run along the ground for several feet, and then grow upwards, rooting at the joints on the ground. Under favourable conditions Rhodes grass is exceedingly hardy, and will produce a large quantity of feed, and it will undoubtedly pay stock-owners to give it a trial on suitable places. It is claimed for it by many who have tried it that it is highly resistant to drought.

Mr. C. T. Musson, of the Hawkesbury Agricultural College, supplies an interesting note in a recent number of the N.S.W. Gazette on the seed of Rhodes grass. He paints out that the flowers are small, and come away from the supporting stalks in two's and three's. If two, then only one good seed is usually formed. The seeds, which are remarkably small for the size of the grass, are spindle shaped and redish brown, the weak seeds being short and whitish. In size and numbers they come near the seeds of the Poas, and approximately 100,000 plants may be obtainable from 1 lb. of seed.

In consequence of its having come so recently into cultivation, there is no guide in the use of this particular species as to quantity required for sowing. It is such a strong bulky grass when well grown that there would seem little necessity to sow heavily; more particularly so, seeing its capacity for "running" and rooting at the nodes (joints).

The main difficulty in using a small quantity would lie in the cohesive property that pertains to the bulk sample. Experiments might be tried in the matter of mixing it with sharp dry sand, or some one small seed, such as white clover or couch. Seeds used for such admixture should, however, have the germ killed by baking or otherwise, and should be carefully and thoroughly mixed with the Rhodes before sowing.

Ten lb. of this seed per acre would provide ninety plants per square foot. Half the quantity would do, provided a fairly even distribution could be obtained. This should be ample. In the long run, probably, only half a dozen would live on that area, those getting the best start providing all the successful plants; those coming on later would be smothered out by the earlier ones overshadowing them. Still it is necessary to put in much more seed than is actually required.

Rhodes grass should be sown with caution, for its creeping habit of growth might prove troublesome in certain situations, and its general suitability to our climate has yet to be proved. But, like many other grasses, the best thing for every farmer to do is to test it on his own land in a small experimental plot, when he can soon decide from personal observation whether it is a grass that will prove profitable to grow.

It has been stated by those who should be in a position to know that C. virgata is a far better grass than C. gayana. It is a strong grower, yields heavily, is succulent and palatable, grows in a dry season, and is said to be less affected by frost.

As a sub-tropical grass, requiring warmth to germinate it, the seed should not be sown till late in spring and where small areas are to be dealt with it is better to sow in seed beds. The seed should be sown on the surface and patted down with the back of a spade, and in six or seven weeks, according to the weather the young plants will be strong enough to put out in their permanent situations.—The New Zealand Farmer Stork and Station Journal.

The Value of Lucerne.

The value of lucerne in a general way has long been understood, but the full possibilities of this crop can scarcely be comprehended. It wonderful prolificacy, its tenacity, its fertilizing properties, and its merits as forage are well known to many farmers. But these, it appears, are only a few of the properties of this wonderful plant. At first it was generally supposed that it would thrive only by irrigation, and needed the best of all soils and a very complete rainfall to establish proper growth. Subsequent experiments have, however, convinced many farmers that it can be grown successfully over a large proportion of our agricultural areas, where soil and rainfall are reasonably propitious. Such being the case it is gratifying to observe that each year the area devoted to lucerne has been enlarged. Besides being a perfect food for horses, cattle, sheep, pigs, and poultry, its chief virtue—and the one that is pronounced to be of most importance—is that which gives it its value as a fertilizer. Lucerne has the faculty of gathering nitrogen from the air for its own support, and the surplus is added to the soil. It is a deep feeder, its roots penetrating the earth to extraordinary depths, drawing toward the surface and utilizing moisture and valuable mineral elements that other crops would never reach, leaving the desirable elements there for future crops of all kinds. By capillary attraction these roots and rootlets draw up moisture from below the surface until the top soil becomes modified and the nature of the paddock changed. The chemical analysis of a cubic foot of earth of a flourishing lucerne paddock shows a wonderful change in moisture contents since the sowing.

According to the Kansas Board of Agriculture, the mere mechanical effect of the extensive root system can scarcely be over-estimated. As soon as germination begins the plant starts its tiny roots downward in seach of moisture. Roots 4ft. long have been found on lucerne only four months old, and when nine months old roots 9ft. long have been located. After the tap root reaches a few inches below the surface it sends out smaller roots that have a lateral growth of a few inches. These, too, in turn take a downward course for moisture, and for mineral elements needed for the growth above. The first smaller roots decay, and others start out from the tap root lower down. These in turn decay, and still others start. The decaying roots add humus to the soil, and the openings left by them for a wonderful system of channels for the penetration of air and water into the soil. Soil which was originally compact is honeycombed, and air and water penetrate the space occupied by dead roots until—when the lucerne paddock is ready to be used for a different crop—the soil has been wonderfully changed, not only in its chemical elements, but in its physical character. The regular deposit of lucerne leaves, even when the utmost care has been used in cutting, has been estimated at one-half ton or more per acre every year. As these leaves contain a great percentage of protein, it can readily be seen that they make a heavy contribution to the soil's fertility. It has been estimated that the value of the stubble of a lucerne crop and the roots contained in the upper 6½in. of the soil is £4 per acre from the fertility standpoint. In addition to the stubble the whole root system contains as much fertility as could be added to the soil by an expenditure of £7 per acre on commercial fertilizers.

Such are some of the facts concerning this marvellous plant, gathered from the pamphlets issued by the experiment stations in the United States, from books by expert students of the plant, and from letters by observant farmers. The discovery and extensive use of this prodigy of all plants have of late been welcomed by scientists as an inestimable blessing to agriculture and an incalculable boon to the human race. One scientist in particular, who is a member of the Kansas State Board of Agriculture, and who is a recognized authority on the subject, as well as the author of several valuable books concerning it, says that to lucerne alone must be credited the great agricultural development of Kansas, Nebraska, and other districts. Without lucerne their development would have been slow and unsatisfactory; with it they are leading the world as grain-producing States. To cite instances of improvement made by the use of this plant, the Wyoming Experiment Station found that wheat following lucerne yielded thirty bushels per acre, as against eighteen bushels when sown after other crops. Oats after lucerne on the land of this same station

yielded seventy-eight bushels per acre, as against thirty-seven bushels after other crops. Hence there is a widespread interest concerning this plant throughout the entire wor.d of agriculture. Its fame has spread throughout the length and breadth of America, not only by reason of its virtues as a fodder, but because of the fertility that it adds to soil wherever it can be grown.

Farmers are warned against sowing it on wet, cold soil, or on land that is subject to floods. The ground for its seed-bed does not requite deep ploughing, but the surface needs to be well harrowed and reduced to a fine tilth. Some get discouraged if the crop does not do well the first season, but if it is mowed every time that it comes into bloom it will improve. Lucerne has wonderful recuperative powers, and possesses the proverbial nine lives of the cat. It has for some years past been recognized in this country as an ideal food in summer time for all kinds of live stock; but as a fertilizer, surpassing in character anything known to the chemistry of farming, it has yet to make local history. It is very desirable to keep young lucerne clear of other weed life, and, above all, to guard against the appearance of an inveterate and rapidly-spreading foe in dodder. Pure seed is the best preventive, but if this parasite does make its appearance, the patch of lucerne whereon it is first detected should be extraminated by fire and sword, or, more correctly, spade.—"Elder's Review."

The Value of Farm-Yard Manure as a Fertilizer.

The value of farmyard manure as a fertilizing agent in connection with the cultivation of English crops is discussed at considerable length in the June number of the Journal of the British Board of Agriculture.

From a large number of analysis, it appears that farmyard manure consists, on the average, of about 75 per cent. of water, about two-thirds of 1 per cent. of nitrogen, one-quarter of 1 per cent. of phosphoric acid, and one-third of 1 per cent. of potash, or per ton about 15 lb. of nitrogen, 5 lb. of phosphoric acid, and 7 lb. of potash. The composition, however, naturally varies with the feeding of the animals and the manner in which the manure has been stored.

During storage, various chemical changes go on in the heaps of manure. As a result, many compounds are given off in gaseous form. Some nitrogen is lost in this way, but the proportion of non-nitrogenous organic matter which passes off is still greater. Water is also evaporated, and as a result of all the changes, the manure which has been stored for a considerable time is more concentrated in nitrogen, potash, and phosphoric acid and in dry matter. One effect of the fermentation which is in active progress is that the active compounds of nitrogen, such as ammonium carbonate, grow less on storage of the manure, as they are converted into insoluble protein-like bodies. Hence, old farm manure is slower in its fertilizing action, and less caustic in its effect upon the delicate roots of seedlings, than fresh manure.

As a direct fertilizing agent, the chief value of farm manure lies in the fact that it contains all the elements of a plant's nutrition — nitrogen, phosphoric acid, and potash—although the phosphoric acid is deficient compared with what it should be in a well-balanced fertilizer. As a result of the various stages of availability in which the nitrogen is present in farm manure, its effect is not fully evident shortly after application, but its influence is continuous for a more or less considerable time after being put on the land.

It is often pointed out that the value of farmyard manare to the land is not altogether confined to its fertilizing properties; its physical effects upon the texture and water-holding powers of the soil are equally important, and indeed, in droughty seasons, particularly with some crops, these effects count for more than fertilizers towards ensuring a good yield. This manure as it rots down into the soil goes to restore the stock of humus which is always undergoing oxidation, and tending to be diminished in quantity. Humus acts beneficially both on light and heavy soils; to sands it gives cohesion and water-retaining power, while by loosely bringing together the finest particles of clay soil, it renders them more porous and pliable.

As already mentioned, a soil which has been enriched in humus by continued applications of farm manure will resist drought better than one in which the humus content is low, and investigation has shown that the difference does not depend so much upon the greater amount of moisture present in the soil containing humus, as in the way this soil w.ll absorb a large amount of water temporarily during heavy rainfall, and then let it work more slowly down into the soil, thus keeping it longer within reach of the crop.—"Agricultural News."

An officer of the Royal College of Veterinary Surgeons in England says it is easy to tell a horse's character by the shape of his nose. If the profile has a gentle curve, and at the same time the ears are pointed and sensitive, the animal may be depended on as being gentle, and at the same time high-spirited. On the other hand, if the horse has a dent in the middle of his nose it is safe to set him down as treacherous and vicious. The Roman-nosed horse is sure to be a good one for hard work, and safe to drive, but he is likely to be slow. A horse with a slight concavity in the profile will be easily scared, and need coaxing, while one that droops his ears is apt to be both lazy and vicious.

The Shearing Shed.

From Queensland Agricultural Journal.

To the small owner as well as to the large proprietor, one of the most important events of the year is the shearing. It is as important to him as is the harvest to the agriculturist, for it is the sum of all his work and care for the past twelve months, so that ignorance or mismanagement may result in serious loss.

It is the object of this article to give, in as clear and simple a manner as possible, the essentials of shearing-shed management, which includes the get-up of a small clip—say that of 4,000 merino sheep of mixed sexes and ages.

I am a strong advocate of the small owner having a shearing plant of his own, or, in the alternative, a share, as one of a group of fellow-selectors, in such.

There is no need to particularise the advantages of machine-shearing over hand-shearing, for hand-shearers good, bad, and indifferent are nearly extinct. The advantage to the selector in having easy access to machinery lies in the fact that the best preventive to the ravages of the maggot fly is crutching by machinery.

A four-stand plant, with oil engine, head plank, and all appurtenances complete, can be procured at Brisbane for less than £100, and the various makers of that class of machinery send experts to any holding to erect and teach the running of machinery at actual cost of his wages and expenses. Over hand-shearing, too, there is an estimated balance in favour of machines of 6d. per sheep in returns. Crutching by hand involves recrutching six weeks or so later, during the fly season, which may be said to extend from May to August, while the closer-cut of machines sees the winter well through. It is, therefore, necessary that an owner should crutch his sheep by machinery, and, if he has his own plant, it can be done at a minimum of cost. One man can crutch 400 sheep per day, and there is no mystery to a man with common sense in running the plant himself after a little instruction from a qualified expert.

Assuming, then, that the owner possesses his own plant and is able to run it himself, What are the essentials to successful shed management?

Taking the processes in due order, they consist of—penning up, shearing, picking up, woolrolling, woolclassing, and pressing.

— Penning Up. —

The duty of the penner-up in a small shed is so light that for three parts of his time he should be available for any other work in the shed. He should see that there is no undue delay in filling the catching pens, and that the sheep are not injured or smothered in the pens.

— Shearing. —

With the Arbitration Court award before him, the owner will have very few contentious matters to deal with. If he be fortunate enough to have four good men, supervision will be very pleasant work. On the other hand, if he has even one "snagger" (i.e., duffer), his pocket and temper will suffer. For that reason it would be wise for him to arrange his shearing time for the early or the late month of the year. From July to October most of the big sheds are in full swing, and there are greater inducements for fast, good men to go there than to shear a small cut of, say, 1,000 per man. In that connection it is well to remember, provided the sheep be strong, that Queensland can shear at any time in the year without loss of stock from the cold. The big losses through inclemency of weather generally occur in the months of October and November. A good, fast man has learned—and he is fast because he has learned—that the shortest way round a sheep is "on the skin"; that going back for a second cut is waste of time; therefore he gets all the wool first time. Holding a sheep easily and comfortably prevents the animal from kicking, and so prevents delay; and he has learned to know the tool with which he earns his living. In consequence he is rarely seen near the expert, but is shearing away merrily, while the average man is waiting for repairs. The average man only knows whether his machine is going well or ill, or at least very little more, while the "snagger" is always in trouble. These last do not know their tools of trade.

The owner will know that he is getting good shearing when he sees that there are comparatively few "second cuts" in the fleeces; that there are no loose trimmings on legs or head; no dead or injured sheep in the counting pens; and no knees jammed into the flanks of the sheep on the "long blow."

A good shearer rarely cuts a sheep. It is generally by accident if he do so. A serious cut should be sewn at once, and a proper antiseptic applied to all cuts. It is the picker-up's duty to see that such is placed in a handy tin on the board ready for accidents, and to apply it. A good shearer is a joy; a bad one should be prosecuted for obtaining money under false pretences.

— Picking Up. —

It is the duty of the picker-up to take the belly waol—which is removed first by the shearer—pick the stained part from it in

the case of wethers being shorn, and place it in the appointed receptacle. When the shearer has finished his sheep and "lets go," the picker-up should put the fleece aside on a clean place, for a moment, and sweep back the locks so that the next sheep may be shorn on a clean board. It is imperative that the "board" be kept clear of locks, otherwise the fleece wool will become full of locks and fribs, necessitating extra work by the woolrollers in picking them out, or else dirty fleeces going into the bins. One source of loss in price is when the valuer sees "fribby" fleeces. When the floor is swept clean, the picker-up takes the fleece and throws it on the wool table with the breech at the end nearest him, and the neck away from him. Good picking up is a big factor in good woolrolling. A clean "board" is imperative in a well-managed shed. A good picker-up is usually the hardest worked rouseabout in a shed.

— Woolrolling. —

Four good shearers will shear an average of 400 to 600 sheep according to sex. Two men at the woolrolling tables are necessary to handle that number of fleeces. The table should be 4ft. wide and not less than 10ft. long. This is somewhat longer than is usual in most woolrooms.

The ordinary method of dealing with the pieces is as follows:—The fleece is thrown out by the picker-up, and the woolrollers immediately skirt off the pieces, throwing them on the floor with all their excellences and imperfections. A man with a broom sweeps them over to a piece-picking table, where the now thoroughly mixed wool is unmixed or sorted. This kind of piece-picking requires skilled men; it is really a woolsorter's job. If they be unskilled, the result is bad work, and consequent loss in value. If skilful, yet slow, there is very soon an accumulation of back work, and more expensive labour is required to keep pace with the shearers. Mostly the work is slummed.

The method I have advocated, and used successfully for the past twenty years does away with the mixing process. It is as follows:—When the picker-up throws out his fleece, the woolrollers take off—first the stained pieces; then the points and edges of flanks (alias 1st pieces), and finally the broken fleece. As they are taken off, each sort is thrown into a basket or other place, and the fleece is then shaken to dislodge fricks and its proper bin. There is no wool locks, rolled, and then placed in lying on the floor; each sort of pieces is taken off by itself, and there cannot be any slumming or back work. In short, instead of a single skirting, there are three—stains, points or 1st pieces, and broken fleece. This method is just as applicable in a shed of 40 shearers as in one of 4. All the men, excepting the sweepers, are on the woolrolling tables, doing work that is easily supervised, and intelligible. A day or two after the start, the ordinary woolroller drops into the method as if he had done nothing else all his life. Piece-pickers in the old sense are unnecessary. A good woolroller shakes his fleece before rolling it, and picks out any inferior pieces from the fleece when he sees them. A bad one puts in the day. Send him on the track.

In regard to skirting, clear bright fleeces, free from seed, should be very lightly skirted. The points of shoulder and breech and very little shoulder or neck wool are taken off. If the fleeces be seedy on the skirts, the seed should be removed, leaving the fleece as free from seed as possible. Sheep that have been running in mulga country often have discoloured wool on the necks, which is full of small twigs and seeds. This wool should be cut out, which in the case of a small clip, well shaken and placed with the 1st pieces. Most of the sticks will fall out if the wool be well shaken. If the owner has much of it, let him keep it for "wet sheep" days, and put all hands on the job.

— Woolclassing. —

There is an old story told of a blackfellow who was put on to class wool on a station where there were few white men. He made two classes and called them "budgeree" and "baal budgeree" (good, and not good). It is told that the wool sold well.

The story may not be true, yet "si non e vero, e ben trovato," and the application of it lies in this:—4,000 merino sheep of regular breeding, and not consisting of dealers' lots, will cut about 20 bales of 350 lbs. each per 1,000—that is, 80 bales. It would be foolish to cut that small clip into more than two fleece classes, with a possible "cast" for very short, shabby, cotty, inferior; therefore, "budgeree" and "baal budgeree" will fill the bill in respect of qualities. Two classes are ample in most small merino clips. The top class should be the lightest, brightest, and best-looking fleeces. (I am writing for the tyro, remember.) The second should take in all the heavy, dull, short, and shabby wools, and it will depend upon the judgment of the owner where to draw the line. If he class his fleeces to condition, he will not be far wrong. Anyhow, it will be better to underclass than have too many sorts. Besides these, he will have broken, 1st pieces, stained pieces, bellies, and locks, as described in the woolrolling part of this article. Of course it is difficult to say what should be done with any clip without inspection, but "budgeree" and "baal budgeree" is a good working rule. He should keep the fleeces clean of locks, stain, and fribs. If the wool be not seedy or burry, he should skirt as lightly as possible. If in doubt whether a fleece is good enough for the top class, he should put it down. He should keep the colour as even as possible in the top sort, and get advice from any person who he has reason to believe knows more of wool than himself. The above is not the whole of woolclassing, but it is a big percentage of it. He will make two sorts of lambs only. The longest and brightest tops; the short wools, bellies and locks together (2nd lambs). I find that I have nearly reached the limits of the space at my command, so, without comment, I shall give a few rules which have borne the test of time, and conclude.

Take the woolpacks, and turn them inside out. Clip all the loose ends of jute to be found in most packs, shake, and turn them back again. Do not make the bales too heavy, nor too light—350 lbs. for fleece wool; 400 lbs. for 2nd pieces; 500 lbs. for locks; not less than 200 lbs. in any sort.

The bales should be branded on the narrow side, and the baler should avoid saying, "First," "second." Say "A," "AA," as the case might be. He should also brand with initials, and also the name of the holding beneath the initials; the quality next; sex below; and the number lowest of all. He should also brand the initial name of holding and the number on the bottom of the bale. He should see that there is no string lying about the floor, and he should provide a bag wherein to place odd ends of string, etc. He should keep the floor clean, the shearing board clean, the fleeces clean of locks and fribs, and keep an eye on everybody and everything.

The Wheatfields of the Ancients.

Egypt holds the pride of place among nations of antiquity as the land in which wheatgrowing was carried out on a very large scale. Frequent references are made to it both in sacred and secular history as a land rich in corn, able not only to supply the requirements of its own dense population, but also producing sufficient for exportation to foreign countries. From painting and inscriptions, with which the ancient Egyptians decorated their tombs, information is to be gleaned concerning the agricultural pursuits of these remarkable people. These pictures and inscriptions, which, after a lapse of several thousands of years, still retain the distinctness of outline and brilliancy of colour of recent productions, give confirmation to the ancient proverb, "There is nothing new under the sun." The pictures referring to rural affairs, according to an authority, reveal a state of advancement at that early date which may lead us to speak modestly of our own attainments. An Egyptian villa comprised all the conveniences of a European one of the present day. Besides a mansion with numerous apartments, there were gardens, orchards, fish ponds, and preserves for game. Attached to it was a farm yard, with sheds for cattle and stables for carriage horses. A steward directed the operations, superintended the labourers, and kept account of the produce and expenditure. The grain was stored in vaulted chambers furnished with openings at the top, reached by steps, into which it was emptied from sacks, with an aperture below for removing it when required. In one painting, in which the sowing of grain is represented, a plough drawn by a pair of oxen goes first. Next comes the sower scattering the seed from a basket. He is followed by another plough, whilst a roller, drawn by two horses yoked abreast, completes the operation. The ancient Egyptians were fully alive to the importance of the rotation of crops, and were skilled in adapting these to the soil and the seasons. Besides growing sufficient corn to supply the needs for local consumption, the ordinary annual supply exported to Rome has been estimated at 20,000,000 bushels. The abundance or scarcity of the harvests of Egypt depended chiefly upon the height of the annual inundation of the Nile. If too low, the crops for the most part could not be sown, and scarcity and famine followed. On the other hand, great calamities befell the country if the Nile rose too high, or above the average level, as in such cases, besides the destruction of cattle and the submerging of villages many of the fields were under water at the proper seeding time.

The nomads of the patriarchal ages, whilst mainly dependent upon their flocks and herds, also followed agricultural pursuits. Job is referred to as not only possessing flocks and herds in large numbers, but also to having 500 yoke of oxen which he employed in ploughing and husbandry. Isaac conjoined wheatgrowing with pastoral pursuits, and along with the Babylonians, Egyptians, and Romans the Israelites are classed as one of the great agricultural nations of antiquity, the land of Palestine being fittingly described as "a land of corn and wine, a land of bread and vineyards, a land of oil-olive and honey." The Mosaic statutes including an agrarian law, based on an equal division of the soil amongst the male adults, a census of which was taken just before they took possession of Canaan. This land was strictly inalienable. The accumulation of debt upon it was prevented by the prohibition of interest, the release of debts every seventh year, and the reversion of the land to the proprietor, or his heirs, at each return of the year of jubilee. The crops chiefly cultivated were wheat, millet, barley, beans, and lentils. Among the ancient Romans agriculture was highly esteemed, and pursued with earnest love and devoted attention. They were a thoroughly agricultural people, and it was only at a later period that commerce, trades, and arts were introduced among them, and even then they occupied a subordinate place. Their passion for agriculture survived long, and when at length their boundless conquests introduced unheard-of luxury and corruption of morals, the noblest minds among them were strongly attracted towards the ancient virtues of the purer and simpler agricultural times. Cicero put into the mouth of Cato a fine picture of the ancient enthusiasm in agriculture. "I come now to the pleasure of husbandry, in which I vastly delight. They are not interrupted by old age, and they seem to me to be the pursuits in which a wise man's life should be spent. The earth does not rebel against authority; it never gives back but with usury what it receives. The gains of husbandry are not what exclusively commend it. I am charmed with the nature and productive virtue of the soil. Can those old men be called unhappy who delight in the cultivation of soil. In my opinion there is no happier life, not only because

the tillage of the soil is salutary to all, but from the pleasure it yields. Nothing can be more profitable, more beautiful, than a well-cultivated farm." In ancient Rome each citizen received at first an allotment of about two acres. After the expulsion of the kings this was increased to about six acres. On the increase of Roman territory the allotment was increased to fifty, and afterwards to even five hundred acres. Pliny, in commenting on Virgil, says:—" Our poet is of opinion that alternate fallows should be made, and that the land should rest entirely every second year. And this is indeed both true and profitable, provided a man has land enough to give the soil this repose. But how if this extent be not sufficient? Let him sow next year's wheat crop on the field where he has just gathered his beans, vetches, or lupins, or such other crops as enrich the ground." In later ages of the Empire agriculture was neglected, and those engaged in it treated with contempt. Many fair regions once carefully cultivated, and highly productive, were abandoned to nature, and became a scene of desolation, the supplies of overgrown Rome being drawn from Egypt, Sicily, and other provinces, which became notable as the granaries of the empire. In the most prosperous days of the Empire much attention was devoted to agricultural pursuits, and one authority has said that:—" Perhaps it is not too much to assert that many of those qualities which fitted them for conquering the world and perfecting their so celebrated jurisprudence, were acquired, or at all events nourished and matured, by the skill, foresight, and persevering industry of the soil." Subjects which are to-day being considered and discussed were also subjects for discussion by the Roman farmer. Referrence has already been made to the opinion of Virgil concerning the fallowing of land and rotation of crops. Pliny says: " Wheat the later it is reaped the better it casts, but the sooner it is reaped the fairer the sample. The best rule is to cut it down before the grain to too hard, when the ear begins to have a reddish-brown appearance. 'Better two days too soon than so many too late,' is a good old maxim, and might pass for an oracle." The same author also remarks: " Cato would also have this point specially considered, that the soil of a farm be good and fertile, also that near it be plenty of labourers, and that it be not far from a large town; moreover, that it have sufficient means for transporting its produce, either by land or water. Also that the house be well built and the land about it be well managed. When there is a good house on the farm the master will be a close occupier, and take the more pleasure in it, and truly it is a good saying that the master's eye is better than his heel."—Elder's Review.

Some Facts About Horses.

About 40 per cent. of the weight of an ordinary horse is muscle. All muscles concerned with locomotion are attached to bones, and when they contract they cause the bones to which they are fastened to move. The lower part of a horse's leg is nearly all bone, but the muscles in the body and upper part of the limbs are attached to various parts of the bony construction by tendons, and can thus produce a motion of the parts located some distance away.

The amount of motion produced by the action of the muscles of, say, one of the horse's hind legs will depend upon the length of the muscles and the length and the relation of the bones to which they are attached. The commonest idea among the students of this subject is expressed in these words: " Long muscles for speed, short muscles for power." A long muscle enables a horse to get over the ground rapidly. A short muscle, however, is not powerful because it is short, but because in horses constructed on that plan the muscles are thicker, contain more fibres, all of which pulling together when contracted exert a much greater pulling force than a long, more slender muscle. It is because of this that in buying horses to draw heavy loads we look for large and heavy muscles, while in roadsters we must attach importance to the length of the muscles.

The most of a horse's muscle is in the hindquarters. This may be a surprise to you, said Mr. Marshall, of the Ohio Agricultural College, recently, but the next time you have an opportunity to see a horse pulling a very heavy load study him carefully. You will be impressed with the idea that most of the work is being done with the hind legs. When the hind foot is moved forward the toe rests on the ground and the leg is bent at the hock joint; if the toe does not slip, and the horse is strong enough for his load, the muscles above pulling on the tendon fastened to the back and upper joint of the hock, will close the joint, or, in other words, straighten the leg, and cause the body to move forward. It is by the performance of this act at every step that the horse moves, although of course the strain on all the parts is much greater when pulling very hard. This will also show the necessity of having large, broad, straight joints and legs that give the horse the most secure footing. You have probably also noticed when driving that many horses put their hind foot on the ground in front of the mark left by the fore foot, and the faster they go the greater will be the distance between the marks made by the fore and hind feet. This shows that the length of a step is determined by the hindquarters; it also explains the need of large, strong hocks and legs that are not so crooked as to seem weak or so straight as to lessen the leverage afforded by this wonderful arrangement of the parts.—Agricultural Gazette.

Mrs. O'Hoggarty: Phwat is yure husband doin' fer his rheumatism Mrs. McLubberty?

Mrs. McLubberty: Cussin' at every-t'ing else.

Lime on the Farm.

(Queensland Journal).

Time was when the Queensland farmer had no troubles either with worn-out soils or with the manifold pests which now cause him so much trouble and expense; but, after land has been unceasingly worked for forty or fifty years—as is the case with many of our farms—both scrub, plain, and forest—it behoves the farmer to renovate the soil by means of more scientific farming, manuring, draining, irrigating, etc. Here and there we find heavy clay soils; elsewhere there are sour soils, and such soils are those to which the judicious application of lime is beneficial.

Realising the value of lime applications to soils, the Florida Experiment Station has issued the following bulletin, which conveys the information that of fifteen plants, arranged in the order they are benefited by the use of lime, sugar cane is third on the list:—

Quicklime (CaO) is obtained by burning native limestone or shells. It combines with water with avidity, crumbles down to fine powder, and forms what is best known as slaked lime. During this process it increases about one-third in weight and about three times in volume.

Air-slaked lime differs from fresh slaked lime in that it contains a large amount of calcium carbonate. In deciding the condition in which to purchase lime, it is well to consider that 100 lbs. of quicklime are equivalent to about 140 lbs. of slaked lime, and 170 lbs. of air-slaked lime.

Floats is finely ground phosphate rock, and may be used to advantage on lands rich in organic matter.

Besides furnishing lime, it also slowly furnishes phosphoric acid. If the soil is in need of lime, other forms are better for supplying the want.

Wood ashes contain from 30 to 50 per cent. of lime, and may be used with good effect. Cypress ashes may be had for nothing in many places in the State. They contain about 50 per cent. of lime, and half per cent. of potash, and may be used to advantage.

Calcium sulphate or gypsum is found in deposits in many parts of the country. Much of the lime in acid phosphate is in this form.

Marl is earthy matter which contains partly decomposed shells. Its use is limited to farms in close proximity to the deposits, since the cost of its transportation is quite high. It is not uncommon for a marl to contain both potash and phosphoric acid in addition to lime.

— How Lime Acts. —

Lime enters into the composition of all plants, and is undoubtedly as much a plant food as potash, phosphoric acid, or nitrogen. A plant will not grow in the absence of lime, but this substance is so widely distributed in Nature that practically all lands contain sufficient lime to supply the needs of the plants that may be grown on it.

The benefit derived from an application of lime is due more to its chemical and physical action on the soil than merely an increase of lime available as plant food.

Without going into detail, the following are chief mechanical changes brought about through the agency of lime:—Lime as sulphate has the power to break up certain compounds containing potash in an unavailable condition. It also aids in the formation of double silicates of potassium and aluminium, in which form the potash, though available, is prevented from leaching out of the soil. It promotes a rapid decomposition of the organic matter in the soil, and causes its nitrogen to be converted into nitrates. This is the form in which nitrogen is best assimilated by plants. If there is an excess of soluble phosphoric acid in the soil, its tendency is to combine with compounds of iron and aluminium and become unavailable. The presence of lime prevents this, and is even believed to be able to decompose any iron or aluminium phosphates which are in the soil, so that the phosphoric acid may be utilised as plant food.

Thus it appears that lime, by its peculiar chemical properties, is capable of rendering available all three of the plant foods which may be in the soil in an inert form.

Another important function of lime is to correct the acidity of soils which are rich in organic matter. Such soils are frequently so sour that certain plants will not grow on them, yet they produce abundant crops after an application of lime. A moderate amount of lime also greatly facilitates the growth of nutrifying organisms which exist on the roots of leguminous plants, and causes the nitrogen which these little helpers secure from the air to be converted into nitrates and in this form stored up in the soil.

— Physical Action of Lime. —

Aside from its chemical action, lime when applied to stiff clay soils renders them more friable, easier to cultivate, and better able to supply moisture, heat, and air to the plants. Its use improves the texture of sandy soils, making them more compact and more capable of retaining moisture and fertilisers. It may be stated here, however, that sandy soils will not bear very heavy applications as will the heavy clay soils.

— What Soils Need Lime. —

From foregoing statements it would seem that most soils would respond favourably to an application of lime. If a soil is decidedly acid or sour, lime may be ap-

:ed with a great degree of as-
rance that benefit will follow.
s application to heavy clay soils
ll usually prove advantageous.
ie use of lime on poor sandy
ils requires caution. When added
such soils it renders the little
ant food in them available and
nds to their rapid exhaustion.
is best in such cases to add
eral supplies of potash and
osphoric acid, and rotate the
ops, using cow peas or velvet
ans to supply the nitrogen and
ganic matter.

— When to Apply Lime. —

In general it may be said that
ring the fall is the proper time
making application. If the land
sour, the application may be
ade just previous to planting.
e same applies if only a small
nount is to be used.

— How to Apply. —

In case quicklime is to be used,
may be placed in small piles
convenient intervals and a gal-
n of water poured on each pile.
hese should then be covered with
rth to protect the lime from the
r. The following day the lime
ould be spread as evenly as pos-
ble on the land and immediately
corporated in the soil with a
arrow. If lumps of unslaked
me remain, the land should be
arrowed a second time after a
w days. It is important that
e lime be thoroughly mixed with
e soil, and it should never be
pplied and turned under. After
reening the slaked lime, it may
e applied to advantage with a
rain drill or a lime spreader, if
hese implements are at hand.

— How Much to Apply. —

This depends largely on the
haracter of the soil and the crops
o be grown. It is considered
etter practice to use small quan-
ities and to apply annually than
o make heavy applications. Many,
owever, apply from 2 to 5 tons
er acre at intervals of from five
o ten years. Half a ton is a fair
uantity for an acre of land pos-
essing a moderate degree of fer-
ility.

— Effect of Lime on Plants. —

All plants are not affected alike
y lime. Most of them are bene-
ted to a greater or less extent;
ome are indifferent; and a few
re injured when grown on recent-
y limed soil. The following is a
st of the more common plants
rown in Florida, arranged in the
rder in which they are benefited
y the lime:—Lettuce, beet, sugar-
ane, celery, onions, parsnips, cabbage, canteloupes, tobacco, egg plants, pepper, pea, fruits, corn, and cotton.

About the only plant grown in the State which is injured by the lime is the watermelon. This applies only when a moderate quantity is used, as peas and other legumes, corn, and cotton are injured by large quantities of lime. It may be said in this connection, that it is better to avoid the use of lime on soils which are to be planted in potatoes, since its use would favour the development of the potato scab fungus.

— Does it pay to Lime. —

In most cases the answer is in the affirmative. A vast amount of experimentation has been conducted in order to answer this question—in fact, nearly every experiment station has done more or less work along this line; and it has been conclusively demonstrated that lime judiciously applied is an efficient means for producing large crops at a good margin of profit. It costs about the same to plant, cultivate, and harvest a given area without regard to the size of the crop; and if this can be doubled by the addition of a few barrels of lime to the acre, the relative profit becomes very much greater. Besides, the lime will manifest a good effect for a number of years. In closing, I wish to repeat that the habit of liming may become pernicious when practised merely for the purpose of wresting from the soil its locked-up plant food; but when practised with a careful system of rotation and fertilising, it yields a profitable return.

How to Handle Old Barb Wire.

We have received from Mr. A. J. Jarrett, the Union's representative at Ardrossan, the description of a very simple contrivance for handling barb wire which has been previously used. Many farmers make running fences using one barb wire, and they always experience some difficulty in rolling it up again and removing it to some other part of the field. Mr. Jarrett writes as follows in reference to this simple contrivance:—

"While out amongst the farmers this week I saw a simple contrivance for winding barb wire out of a fence for the purpose of shifting same to another fence. It is simply a forked stick with the end of the barb wire fixed to the double end of the fork (about 18 inches up from the fork), with a boy holding the single end and a man winding at the other end. By this means the wire can be wound up nearly as fast as one can walk. When the stick is full cut off and get another fork. The wire can then be carted to the new fence and unwound the same way as wound up.

Of late considerable discussion has taken place as to the best age to use a boar for breeding purposes. Authorities agree that in no case is it wise to use a boar under the age of nine or ten months. The best age, however, is when the boar is from three to five years old; mated to a sow of similar age, the result is the most prolific, and produces vigorous and perfect offspring.

Turkey Raising for Farmers.

One has but to walk through almost any stubble field in the State—more especially in the North—to realize that there is a large proportion of grain going to waste upon the ground. Cannot this grain, which has escaped the stripper by the angle at which the stalk and head lie, or else been shaken from the ear at first contact with the stripper combs, be put to some direct use and converted into cash? To lie thus on the ground means complete waste of actual live-giving food to man, beast, and bird. The prospect of recovering something therefrom during the next season in the form of a self-sown crop possibly has a few advocates in the mallee and similar wheat land. But such style of farming is not to be recommended. Land which is nominally lying fallow should not be allowed to be performing scratch duties by exhausting its energies over this class of catch crop. In the old country, especially in the North of England, one is accustomed to see huge flocks of geese ranging over the stubble. This stubble is, of course, of that short nature which results upon reaping, as distinct from the residue after stripping. The proportion of grain shed on the ground or of ear and stalk lying thereon, is infinitely less than in Australian wheatfields. And yet great efforts are made in the old country to put the waste to some direct use. The gleaner is quite a feature of the closing scenes which precede harvest thanksgiving, and has ever been treated—usually they are women and children—with an almost sacred compassion, from the days of Biblical history and of Ruth, the prototype of all gleaners. There is, however, much grain shaken out of the ear by wind and weather. To gather this and convert the food into flesh, and flesh into money, droves of geese are employed. They are brought over by boat to the North of England from Ireland, and on being landed are driven along the main roads literally in droves, just as we in this country are familiar with the process of travelling sheep. Drafts are sold from the main flock to farmers alongside the road, and the geese themselves have their feet toughened for the roads by being driven across alternate strips of tar and sand.

This has the effect of attaching a very effective artificial sole to the base of the foot, and enables the bird so provided to walk scores of miles along hard, flinty roads, without any risk of becoming footsore.

In New South Wales almost every farmer and selector provides himself with a flock of turkeys. They are to be met with of an evening perched up in rows along the dead branches of timber which lie all over the paddocks, as well as about the farming buildings. In South Australia, notwithstanding the vast annual waste which occurs in the grain paddocks, remarkably little effort is made to gather up the waste and convert at least a portion thereof into the form of turkey flesh. The majority of farmers' wives and daughters will bewail their want of luck in rearing turkeys, and catalogue their list of failures for years past. With the exception of places like Martindale, in the Lower North, and Yalluna, on the West Coast, where the bronzewing turkey has been established in large numbers, one rarely meets with the turkey in numerical strength anywhere. The demand for turkeys as an article of diet is not restricted as much as is the case with the goose to one season of the year; they are marketable and edibfe at any time of the year, and for that matter all the year round. Some sort of prestige, in most cases the direct result of high prices, reduces the appearance of the bird on the table to Sundays and fe tive occasions. That there shou be money in turkeys would, on t face of values asked by the ve dor poultryman, seem undeniabl Prices have never been known t sag, nor the bird to be sold reta over the counter otherwise tha by the pound weight. If sold a per head, one may rest assure that the vendor knows to a nicet how much each bird will weigh.

There has been no lack of exper ment at raising turkeys among t ranks of all who pay some for of attention to ordinary poultr Where, however, a want of succes has attended preliminary effort the real reason has seldom bee sought or thought out. The ex perience of the successful can b turned to advantage by novice and much of that discourageme which is the customary role of th beginner removed by copyin these precedents. The turkey r quires to be raised under cond tions which approach as nearly a

sible the wild state. The breed-stock requires wide range, over gh land, where rocks and hes abound, and trees are few. hens make their nests in the hes according to their own et wills. When one has begun lay, a stake should be set up mark the spot and the eggs uld be gathered each day. en a hen becomes broody, let have a clutch of eggs. After ching, the young should be ned and cared for until three four weeks old, after which all be turned out into the pad-ks. Here, where the pasture is gh, they will pick up a fair ng of insect life, especially of grasshopper order, and any rcity of natural food can be sidized with a little grain, three or four times a week. finement of the young chicks close coops is about as fatal as osure to wet. When hatched ly, the chicks do not get ggled, through the wet grass g too long, and the hen is the t shelter from rain if the brood not too large. Young turkeys d little food. Stale bread pped fine, with an equal quan- of green stuff, fed on a pile gravel or sharp grit, is an ideal d. Too much food has killed re turkeys than too little. nty of fresh air is absolutely ne-cessary to success. The young should be taught to roost with the old birds in the open, so that they can have plenty of air. They are better disposed on fences and on dead timber than in any fancy type of poultry house, either ancient or modern. Turkeys are extremely susceptible to the same diseases as chickens, hence it is unwise to mix them. This is contrary to the practice on many farms, where all the poultry run together. While the young are very tender, and require much attention, the older ones are extremely hardy, and well able to take care of themselves when ranging at large. In-breeding and breeding from immature or weak stock are fruitful causes of disease, though about the most aggressive method of promoting disease is to keep the birds for a considerable time on the same ground. Liver trouble, known as blackhead, appears to be the principal disease from which they suffer, but this seems more the result of an attempt to over-domesticate the bird. Of wild ancestry, the turkey does not need coddling, and the more freedom it has, and the nearer to natural conditions it is kept, the better it thrives. The reason that turkeys fail on many a farm seems to lie in the fact that they require entirely different treatment from the other farm poultry, and in a majority of cases do not get it. Domestication threatens to thwart all natural instinct of ranging abroad, scavenging, etc. In the Indian Runner duck this faculty will soon be lost, but with the turkey this instinct seems to remain, but the bird itself dies.

Fattening Turkeys.

For fattening turkeys they can be either cooped up, housed in some large outbuilding, or let run in the meadows and well fed. If cooped up, two or more should be placed together, or they will fret and lose flesh instead of making it. Whether cooped or shut up in a roomy building they must be provided with plenty of grit and greenstuff, or instead of fattening they will get thin and waste.

Three weeks are considered sufficient time for the hens, and a little longer for the cocks, provided the birds are in good condition when shut up. Letting the turkeys have a moderate amount of liberty is, without doubt the best way, and necessitates less labour, for if shut up the building must not only be well ventilated, but kept scrupulously clean, and the birds be provided with plenty of fresh green food. In fattening turkeys, the chief thing to be borne in mind is that the food must be of an oleaginous or saccharine kind. Potatoes, swedes, mangolds, boiled soft and mixed with ground oats, barley meal, buckwheat meal, or maize meal constitutes good fattening food.

The French fatten with beetroot, artichokes, or potatoes, boiled and mixed with meal, and give acorns, chestnuts, and walnuts. The latter they consider gives a delicious flavour to the meat. It is best to vary the food as much as possible, which gives the birds a keener relish, and so induces them to consume more and fatten quicker. They fatten much faster if the food be mixed with milk, and milk be given them to drink instead of water. One word of warning: Care must be taken not to give too much maize, or the colour of the flesh will be spoilt.

Oiling Boots.

For oiling boots, or leather of any sort, the best oil I have ever used is draught castor and neatsfoot mixed in equal parts. A paint brush, or one similarly shaped made of binder twine, is handy to apply the oil without messing one's hands. Boots should be oiled once a month, taking care to well oil the leather where the sole and upper meet. This part, if unoiled, will sooner perish than any other part of the boot. With boots well oiled I have worn out three soles before the uppers were done. Fat is poor for winter use. During the cold weather the fat solidifies and renders the leather very hard and stiff. If fat must be used, melt a quantity and add a quantity of kerosene—about an equal amount should do. Keep the mixture well stirred to thoroughly emulsify the kerosene. This penetrates well, and is much better than pure fat. Sometimes a pinch of kerorene mixed with melted fat does very well. In cold weather, from three to four times as much kerosene should be added to the fat. In warm weather much less kerosene will do. The main points are to have the fat melted—but not boiling—and to keep stirring the mixture till it has cooled.—Exchange.

Nitrate of Soda.

WHERE IT IS FOUND AND HOW IT IS USED.

From The New Pealand Farmer Stock Station Journal

Nitrate of soda is not a very popular artificial manure, partly owing to its comparatively high price, and partly because its economical and special use is not understood as it deserves to be. With the higher standard of farming which is gradually coming to the front in this country, it is however, only a question of time before it is much more largely used, and a right understanding as to its uses and application will more speedily lead to this. In a special article which appeared recently in the "Mark Lane Express," this source of one of the most important elements of plant food is admirably dealt with: "Imagine," says the paper, "a stretch of waste land extending from London to beyond York and broad as from London to Bristol! an absolure waste, covered with sand, without rain from year to year, bearing on its surface on plant, no bird, beast, reptile, or insect. Such was the wide area of nitrate deposits in 1835 when Darwin visited it, as described by him in his 'Journal of a Voyage round the round the World.' It seems as if the genious of desolation was guarding the buried treasure which was destined, in the future, to enrich the crops of the world from generation to generation.

"At that time Iquique was a little port with a few small vessels, and a group of miserable houses. The nitrate industry was just beginning. Darwin rode out about forty miles to the saltpetre works, 'across an undulating country, a complete and utter desert. The road was strewed with the bones of the poor beasts of burden that had died on it. Excepting a few vultures, which prey on the carcases, there was no living thing to be seen. He saw only one vegetable production, a minute lichen growing on the bones of a dead mule."

"What a difference between then and now. At the present time Iquique, and the other principal nitrate shipping ports are flourishing towns with large populations. The desert is dotted with nitrate of soda works (oficinas), and an army of about 50,000 men is engaged in mining, preparing, and shipping the nitrate. Several railways have been constructed to convey the nitrate from the mines to the coast and carry back to the works machinery, food, coal, and all the paraphernalia necessary in conducting important mining operations in the midst of a desert country.

"The appearance of the whole arid district is remarkable, as it is covered by a thick crust of salt alluvium, and looks like a 'country after snow before the last dirty patches have thawed.' Underneath the hard top surface at the depth of a few feet is found the deposit of raw crude nitrate of soda, largely mixed with impurities. This stratum of impure nitrate is called 'caliche,' and varies in thickness from a foot and a half to 12 feet. It contains from 20 to 40 per cent. of pure nitrate of soda.

"The caliche is blown out of the ground by the use of explosives, broken up sufficiently small to handle and then carted to the works, where it undergoes the refining process and is turned out in the form of the commercial commodity, well known to all intelligent farmers.

"The mining and preparation of nitrate of soda is by no means a simple operations. It requires great care, combined with technical skill and expensive machinery.

"From the crude methods first employed the process has gradually developed into a highly scientific operation It is necessary to manufacture the product uniform in quality in enormous quantities, and this involves constant and careful supervision.

— Origin and Extent of Deposits. —

"The origin of the deposits is a problem which geologists have not been able to solve with any certainty. There are several theories, but to eacv of them objections of a more or less apparently conclusive nature can be advanced.

"The whole strip of country has evidently been subjected to primeval titanic convulsions. Earthquakes and volcanoes seem to have used that part of the globe as a playground. To the practical men speculation as to the combined causes which have produced the deposits is a waste of time. Th[e] fact suffices for him that there exis[ts] the deposit which has been found [to] extend over an area of 400 to 5[00] miles, and containing, according [to] the recent reports made to the Chili[an] Government, sufficient reserves of t[he] valuable material to satisfy the r[e]quirements of the world for a peri[od] far beyond our lifetime."

It has been stated, and the stat[e]ment has been repeated so often fro[m] mouth to mouth, that it has obtaine[d] more credence that it deserves, th[at] the deposits, in consequence of t[he] enormous shipment, will be exhaust[ed] within a measurable distance of tim[e] and thirty to forty years has bee[n] mentioned as the limit. The assertio[n] may have been made as to the prese[nt] mines; it certainly is not true as [to] the whole enormous district. Fre[sh] mines are continually being opened u[p] new nitrate districts have been di[s]covered, old mines are being extende[d]. It is not possible to estimate eve[n] approximately the actual area a[nd] extent of the whole nitrate regio[n] but it seems certain that there w[ill] be no scarcity for at least anoth[er] century.

The following complete analysis r[e]presents the average quality of co[m]mercial agricultural nitrate:—

	Per ce[nt]
Chloride of sodium (common salt)	
Pure dry nitrate of soda ...	
Sulphate of sodium	(
Insoluble matter	(
Moisture	

The characteristic of nitrate of so[da] which gives it such a great va[lue] as a fertiliser, is that it is a hig[hly] concentrated nitrogenous materi[al] containing its nitrogen in the fo[rm] most quickly and easily available [for] assimilation by plants. Its spec[ial] quality, and that which distinguish[es] it from other chemical manures, is [its] great solubility and consequently speedy diffusion through the soil.

A ton of nitrate of soda contai[ns] 350 lb. of nitrogen, so that a dressi[ng] of 1 cwt. to the acre supplies 17½ of pure nitrogen. This is just abo[ut] as much as is present in 1½ tons [of] farmyard manure, with the differe[nce] that the nitrogen in the nitrate [of] soda is all quickly available, wh[ile] that in farmyard manure is in t[he] form of organic substances which h[as] to undergo several chemical proces[ses] before coming to the condition [in] which it is available for pl[ant] nourishment.

As we have said in the precedi[ng] paragraph, nitrate of soda conta[ins] about 35 per cent. of soda, and, a[s a] rule, no value is attached to t[his] constituent, but, as Mr. Hall, Direc[tor] of the Rothamsted Experimen[tal] Station, has pointed out it is n[ot] sufficiently realised how valuable t[he] soda may be; not on account of t[he] nourishment it may supply to [the] plant, but because of its effect u[pon] the insoluble potash compounds in [the] soil; indeed to such an extent d[oes] this action take place that in farm[...]

practice a dressing of nitrate of soda on any but the lighter class of soils may dispense with the necessity of any separate potash manuring, even for potash loving plants. This fact appears to be clearly demonstrated by some of the Rothamsted experiments on the mangel crop.

For twenty-five years in the Rothamsted experiment the use of nitrate of soda alone enabled the soil to supply a mangel crop with the large amount of potash it wanted, though the store of potash in the soil apparently soon becomes exhausted when a manure is used which cannot bring it into solution.

With other crops, continuing Mr. Hall's remarks, the same results are manifest, though not so quickly as in the case of mangels. For example, it will be seen from the barley experiment that when the manure contains potash the ammonia salts yield practically the same crops as nitrate of soda when the nitrogenous manure is nitrate of soda the omission of potash from the manure causes no diminution in the yield.

Nitrate of soda should always be bought with a guarantee of 95 per cent. purity, which contains 15.6 per cent. of nitrogen, equivalent to 19 per cent. of ammonia.

The Chilian Government is always anxious to keep up the reputation of an article that brings so much grist to their mill in the shape of export duty, and have recently issued definite instructions to their customs officers that all bags before shipment must be clearly marked with the distinguishing mark of the producing oficina, and that a watch should be kept on any firms in Chili who may be considered likely to ship nitrate of soda of inferior grade.

The colour of nitrate of soda is no indication of quality. It may be grey, or yellow, or white. The buyer need not worry about that point so long as the guarantee of 95 per cent., and the quality is confirmed by analysis. If, however, a parcel arrives very caked, it should not be accepted as a good delivery.

Nitrate of soda is usually applied separately as a top dressing, but sometimes a farmer desires to apply it with other fertilisers. It may be mixed with basic slag, potash salts, phosphatic guano, bone-meal, and practically all fertilisers, without much inconvenience; but if mixed with superphosphate, dissolved bones, and any chemical manure prepared with sulphuric acid, the operation should only be performed just before the mixed manure can be used.

As a rule, we should say that nitrate of soda does not lend itself favourably for mixing purposes. Even when no chemical action is set up, as in mixtures of nitrate of soda and superphosphate, the mixtures are very liable to cake. It is better to apply the manures separately.

When nitrate of soda is emptied out of the bags a little of the nitrate always sticks to the bags. It is a pity to lose this quantity, and the best plan is to soak the bags in water, thus dissolving the nitrate and using it as a liquid manure. It may be mentioned that the best strength for such a solution is ½oz. nitrate to a gallon of water. This solution is a capital liquid manure for the garden or to throw over the compost heap.

— Use and Application of Nitrate of Soda. —

It is not necessary to dwell upon the fact that all cultivated crops require for their proper development a supply of nitrogen, phosphate of lime, and potash. The crops, according to their habit, of growth, extract these constituents in different proportions and varying degrees of rapidly. This is the point to be borne in mind, as upon it the proper choice of the fertilisers depends. Nitrate of soda supplies only one constituent which is a direct plant food, and in order to derive the best results from its use the soil must also have a sufficiency of the other ingredients of plant food.

There may be a balance of these constituents left over from the manures applied to the precedinb crop in the rotation, or in some soils there may be a sufficient natural supply of potash rendered available by the soda in the nitrate of soda; but if not, it is essential that in addition to the application of nitrate there should also be applications of phosphate of lime and potash.

It is better to give nitrate of soda in two small dressings than in one large application. Numerous experiments have proved this fact. A small dose just when the plant appears above the ground followed by a second dose a fortnight ot a month later according to the weather, is the best system.

The crops which essentially benefit by application of nitrate of soda are the deep-rooting crops. For wheat and mangels, says Mr. Hall, the nitrogen in nitrate of soda gives a better return than an equivalent amount of nitrogen in ammonia salts. With the mangels particularly it is seen that the plants manured with nitrate continue to grow long after those manured with ammonia salts have so completed their growths that the leaves are beginning to turn yellow and flacid. These differences are explained by the deeper rooting habit induced by the nitrate, the plant is less affected by the drought and the changes of temperature incident to autumn, growth is more prolonged, with corollary of a larger yield but a later and less uniform maturity.

It may be generally recommended as a manure for all crops, except, perhaps, the so-called leguminous crops, such as clover, beans, peas, etc., whose ability to obtain nitrogen for themselves renders the application of expensive nitrogenous manures unadvisable.

An interesting point is the curious effect which nitrate of soda seems to have on the colour of the leaves of plants. This interesting fact has been strikingly demonstrated at the Rothamsted Experimental Station, in the contrast in the colour of the leaves of different experimental grass plots, manured with nitrate of soda and sulphate of ammonia respectively, the plots manured with nitrate of soda being distinctly darker in hue, obviously owing to the greater production of chlorophyll or green matter. Such a depth of colour would seem to indicate a more healthy development.

The Board of Agriculture in their useful leaflet on "The Purchase of Artificial Manures" express the opinion that nitrate of soda is specially suitable in the following sircumstances.

(a) For use on heavy land.
(c) For use as a top dressing.
(d) For use in a dry district.
(e) For use where immediate effect is desired.

It has often been said — more formerly than at present—that the use of nitrate of soda is calculated to impoverish the soil, and that it tends to produce bulk rather than quality.

There is no foundation for either of these charges if it is properly employed. The effects complained of are not really due to the fertiliser but to the injudicious manner in which it has been applied.

If used for a crop growing in a soil poor in the other constituents of plant food it will stimulate the plant to rapid growth, and the poor plant can only develop one side of its growth; thus an impoverished meadow dressed with nitrate of soda and starved as to phosphate of lime and potash will produce a crop of rank grass, whereas if the other constituents had also been applied the growth would have been normal.

A heavy dressing, especially if applied late in the season, will often cause a cereal crop to lodge, but this is not nearly so likely to occur if the soil has a sufficiency of available phosphate and potash, so that the structure of the plant is strengthened with the mineral elements.

As to exhausting the soil, it is quite true, that nitrate of soda enables the plant to assimilate a larger quantity of the plant food in the soil, but this is simply equivalent to saying that it places the farmer in a position to turn more quickly into money the raw material of the soil, Of course, when this raw material is worked up by the plant into a crop, it must be replaced so that the next crop can start manufacturing again. This process cannot be called exhausting the soil, but utilising it in the best way. It represents the policy of the "nimble ninepence."

Danish Dairy Cattle Breeding.

Information regarding the methods adopted for improving the dairy herds of Denmark is always instructive, and some particulars are furnished by an article in the "Farm, Field, and Fireside," a condensation of which will be of interest to local breeders. The selection of breeding centres—that is, a systematic selection of the best herds, which then receive official recognition as "breeding centres," is a special feature, introduced in 1884. The herds are entered for a competition which is carried for two whole years by a committee of judges, who visit the herds on the farms five or six times, while assistants on every twentieth day during the two years visit each of the competing herds, weigh the milk of each cow, and draw up the family herd book, in which the whole herd is arranged, according to maternal descent, each animal being described with its sire and dam, milk production, and price. At the end of two years' testing the committee of judges have acquired reliable information as to the value for use and for breeding of the different herds. The best herds are then designated as "breeding centres," with the result that the demand for breeding animals from these herds is enhanced, and higher prices paid for them. A full report of the result of the two years' competition is published. The Cattle Breeders' Association have for their principal aim the purchase of good bulls. From 1887 the State gave a yearly grant, which helped the movement on. There are now 1,300 cattle breeders' associations, with 1,500 bulls, the State giving £8 per annum per bull, on condition that the bulls have taken prizes, that the committee select the best cows of the members to be served by the bull, and that the committee at least once a year inspect the herds on the farms as to state of health.

What is Colostrum?

Physiologists all admit that milk is formed by the degeneration or breaking up of the cellular matter contained within the udder. The milk glands are composed of numberless small vesicles, consisting of thin structureless membranes lined with epithelial cells; the space within these vesicles contains, before a cow becomes pregnant, a small quantity of yellowish mucus, and when conception takes place the cells begin to enlarge and to fill with fat globules. At the same time new cells are formed, and the old ones are pushed forward and fill the vesicles, and, towards the end of pregnancy, even reach the large milk ducts and milk cistern. When birth takes place the cell building in the vesicles becomes more rapid, and is somewhat altered in character. The previous secretions are the first to appear, forming the colostrum, which, in three or four days, is followed by true or normal milk. Colostrum has a purgative action, and is, on this account, the best food for a newly-born calf, clearing the bowels of those matters which have there accumulated during the foetal stage. For human consumption it is not suited, although occasionally used in cooking. Butter made from it is of a deep reddish-orange colour, soft, and quickly becoming rancid, while for cheese-making it is still less suited. Some farmers are in the habit of letting the cow drink part of her own milk directly after calving, but this is unnatural, and a practice not to be recommended. There is no better use for this first milk than giving it to the calf, and if there is more of it than the calf can take, it should be thrown away or given to pigs.

Following is the method adopted by a big dairy farm in New York State for bringing up calves: —"The calf is left with the dam for three days. We believe that there are elements in the mother's milk at that time that are essential to the calf. Furthermore, it is but natural for the calf to remain with the cow during this time, and it is nothing more than right. At the end of three days the calf is taken away and taught to drink milk. We give it nine quarts milk per day for about a month, when we add a little oil-meal, mush, and skim-milk from the separator. This is mixed with the whole milk and gradually increased until the calf is six weeks old, at which time the whole milk is taken away. The calves are then given ground oats and bran and a little clover hay, which is increased as they develop."

Dynamite on the Farm.

Last month we reprinted a letter n the various uses of dynamite in oil preparation. From the same ource "The South African Journal f Agriculture" we take the following teresting editorial comments. Since e appearance of the last issue, conining a contribution by Mr. Kenneth Quinan, General Manager of the ape Explosives Works, Somerset est, Cape Province, on the use of ynamite in agriculture, we have had pportunities of witnessing several ery interesting demonstrations bearg on the subject. The first we saw as carried out by Mr. Wingateright, of Johannesburg, on Mr. ussel's farm at Birchleigh, a wayde station close to Zuurfontein, on e Pretoria-Johannesburg railway. he conditions here were sufficiently pical of the high veld to give a ery fair idea of the possible value f this particular method to farmers similar circumstances. The soil is deep loam, and when the experients were carried out was in a suitble condition to show sound results. hat is to say, the spot selected was ry, and the sub-soil seemed well comacted. The method adopted by Mr. right was to bore holes a little ore than half an inch in diameter depths varying from about 3 feet inches to about 5 feet 6 inches. In ach hole he lowered one cartridge, eighing about 2 ounces of ordinary elignite, the blgsting compound used r rock-breaking in the mines. Prior lowering, the usual detonator was, f course, attached to the cartridge the ordinary way, and the neessary length of fuse to allow of same being lighted to explode the charge. The hole was then tamped with damp earth, and the fuse lighted. The effect of the explosion in the deeper holes was not much marked on the surface, and the ground being so hard, it was difficult to dig down to the lower depths to see what had happened below. But the effects of the charges in the shallower holes, say from 3 feet 6 nches to 4 feet, was more satisfactory, as not only could the result be noticed on the surface, but the action of the explosive was such that the ground was easily removed with a spade and cracks and fissures could be traced in some instances as far as 6 to 7 feet from the centre of the explosion. On removing the top soil, the effect on the sub-soil was most marked and highly satifactory, it is doubtful if it would have been possible to get a plough into this pacticular piece of ground in the condition it then presented, so that here at least was the beginnings of the solution of one of this country's serious cultural problems.

The work done by Wright must be taken as of an entirely experimental character, for though an expert in the handling of explosives for other purposes, he is, we believe, nore or less of an amatiur in conducting agricultural operations by its means. In addition to this, it has to be remembered that he was further handicapped, in that he had to fix up all the implements for this purpose. His method of sinking the holes, for instance, was to use an auger, which he had to have specially made. Though this was effective, the results of later demonstrations we had the pleasure of seeing show that the work of sinking the holes for the charges can be done better and with more expedition by other means. The explosive he applied is also quite different to that which has been brought into use for this purpose. Therefore, considering all the circumstances, Mr. Wrightffls experiments may be taken as even more successful than they appeared, and it is hoped that may lead to encourage others to follow them up on a field scale. We understand that Mr. Russel intends giving the system a fair trial at no distant date. That he and others similarly situated should be encouraged to carry on this work is amply shown by the results which have been obtained not only in America, where these practices are quite common, but in the districts of the Western Province of the Cape, where Mr. Quinan has been carrying out some exceedingly valuable demonstration work, as related in our last issue.

The result of a personal attendance at some of Mr. Buinanffls demonstrations, and considerable discussion with that gentleman and members of his staff, has impressed us deeply with the conviction that this method of sub-soiling should prove of incalculable value to many parts of South Africa. But to assure success, the work must be carefully and properly handled, and "rule of thumb" will have to be carefully avoided. In other words, everything must be adjusted to the local conditions of soil and climate and from the first, nothing but the correct implements and the correct explosive used. The fact has been noted that Mr. Wright used gelignite, a highly powerful compound. That gentleman, of course used that article because it was easiest obtainable for his experiments. Now the make of explosive used for these purposes in America is what has come to be known as agricultural dynam te, a blasting compound wh ch acts in a differentmanner to gelignite. As the latter is made specially for blasting rock, its explosive velocity is very high. Its action in soil is accordingly rather different to that of the specially compounded agricultural dynamite, which is specially made to use in soil instead of rock. In other words, the agricultural blasting compound explodes slower than the rock-blasting compound. Therefore any one who is desirous of going in for this system should see that the right explosive is obtained. It can be manufactured by any explosive factory, but so far as we are aware, the Cape factory is the only one turning it out in this country at present.

The necessity of paying careful attention to this detail was fully apparent at demonstrations we had the pleasure of witnessing at the Government Viticultural Station at Paarl and on Sir Thomas Smartt's farm at Stellenbosch. Though the ground at each of these places was not is such a favourable condition for blasting as

(Continued on page 180).

Water Requirements of Crops.

By John W. Paterson, B.Sc., Ph. D., Experimentalist.

Of the various requirements for the growth of a crop the most obvious is a sufficient supply of water. Ordinary experience points to the conclusion that the quantity required must be large. Green house plants require frequent watering or they shrivel and dry up. A crop of lucerne cut in the morning is soon withered, because it ceases to receive water from the roots. Year after year the yields from dry farming depend more upon rainfall than, practically speaking, upon anything else. In the drier wheat areas of Victoria the soil may not receive enough rainfall to grow a crop every year, but, by fallowing in alternate years the water may sufficiently accumulate to grow a crop every second.

To determine exactly how much water is required by growing crops, attempts have been made by different investigators in different countries of the world. In all such investigations, apart from those of botanical interest only, the method is the same. The amount of water evaporated or "transpired" by a crop during its entire growth is found by weighing. At harvest, the crop is cut off close to the ground and dried. When the weight of water transpired is now divided by the weight of crop, there is found what is called the "transpiration ratio." This gives the number of pounds (parts) of water transpired by the crop during growth for each pound (part) of dry matter produced.

In such investigation the water transpired is found by growing the plants in pots. A pot is filled with a certain standard weight of soil (usually from 20 to 120 lb.) of a certain wetness, and the crop is planted or sown. The pot is watered, usually daily, or four times a week; and this is done on the scales. At watering, the loss of weight since the previous watering is noted down, and the pot is then brought up to its standard weight again by adding more water. The water lost from a cropped pot will include water transpired by the plant, also water evaporated directly from the soil. The latter is most simply discounted by setting up similar pots without a crop, and deducting the losses there from the losses on the cropped pots throughout the season. In transpiration experiments the pots must be protected from rain in order to reserve control of the water supply. This is usually done by placing the pots on low trolleys standing on rails, so that they can be run under cover at night and on wet days.

Proceeding on the general lines of investigation indicated, the following results have been obtained by different workers:—

TABLE I.

	Lawes (1) (England).	Hellriegel (2) (Germany).	King (3) (United States).	Leather (4) (India).
Wheat ...	247	338	—	850
Barley ...	257	—	393	680
Oats ...	—	376	522	870
Rye ...	—	353	—	—
Maize ...	—	—	310	—
Beans ...	209	282	—	—
Peas ...	259	273	477	830
Clover ...	269	310	453	—
Buchwheat	—	363	—	—
Rape ...	—	329	—	—

The figures state the transpiration ratios found by different observers. Before going on to discuss them, it is necessary to glance briefly at the uses of water to the plant.

Water enters the plant body by the roots, passes upwards through the plant, and performs certain useful work. It carries dissolved phosphates, nitrates, etc., from the soil into the plant; it is necessary for the life and growth of the protoplasm or living part of the plant, and for the action of ferments; a small part of the water absorbed enters chemically into organic material in the process of carbon assimilation.

Carbon assimilation is the process whereby green plants feed from the carbon dioxide gas of the air and from water. About 95 per cent. of the dry matter of crops is formed from air and water in this way.

It is difficult to say in which of its uses to the plant it becomes necessary that so much water should pass through it during the period of growth. The inward passage of soil constituents probably does not altogether require it, as the water current and the soil nutrient movement are within inside limits independent. It is more likely that the partial parching of a crop restricts growth, in the first instance, by increasing the difficulty of carbon assimilation. This up-hill chemical change requires the presence of very much water in the plant leaf, in addition to the relatively small amount which is decomposed there.

Transpiration of water takes place chiefly through little pores or openings called stomata, which are most abundant on the under side of the leaf. These pores or stomata open and close automatically, according as the water supply is greater or less; but sun and wind modify their control by tending to open them. With the pores open, transpiration proceeds apace, but is naturally more rapid with a dry than a humid atmosphere. It is also very much greater in light than darkness, and plants wilted at night may appear fresh in the morning.

Looking to the effect of sun, wind, and a dry atmosphere upon evaporation from the leaves of plants, one would expect that the amount of water lost would in large measure be dependent upon the climate. It has been mentioned that much water is essential to carbon assimilation. This takes place in the green leaves, and only by day. As water is continually passing through the leaves on its way out by day, it follows that the water is only available as an aid to assimilation in the course of its passage. Now, as transpiration from the leaves is more active in a dry sunny climate, it would seem that more water must pass through the plant to maintain a suitable supply for carbon-assimilation in such a climate than in a dull humid one where it lingers longer in the leaf. In other words, a definite amount of water may be necessary for carbon-assimilation at its best, in a certain plant, under a certain intensity of light, and at a given instant, but as transpiration is more rapid in a dry climate, a larger amount of water must be absorbed there than in a humid one in order to maintain equally good water conditions in the leaf.

Returning now to the figures of Table I., it will be seen that an attempt has been made in each case to fix the transpiration ratio as a specific character of the crop. If however as we have endeavoured to show, the usefulness of water is dependent, in the first degree, upon the length of time the leaf is able to retain it, it becomes obvious that the transpiration ratio is less a factor depending upon the kind of crop than upon the climatic conditions of the country in which the experiments are carried out. Comparision of the results of the different workers bears in a rough way this theory out. The transpiration ration for production seems to be lowest in the country with the most humid climate, and differences due to crop are generally small as compared to differences due to country.

While the rate of transpiration from plants is largely dependent upon the physical conditions of climate which determine rate of drying, it cannot

be supposed to be altogether so. The cells of the stomata respond to sun and wind, but this response bears no relation to their drying effect. Consideration of the vigour or tone of the plant also comes in. Nevertheless it is certain that the climatic conditions which cause drying have a very great influence upon the transpiration ratio of growing crops, and that by knowing the relative rates of evaporation from a free water surface at two places the transpiration requirements at one place could be approximately calculated for the other.

As transpiration experiments of other countries seemed unlikely, for the reasons stated, to be of direct application to Australian conditions, some test pots were set out at Burnley Horticultural Gardens during the past season. Wheat and oats were selected, and the general method adopted was that already described. The pots, which were adapted to the Wagner pattern, contained 37 lbs. 1 oz. of dry soil, made up to contain 18.5 per cent. of water (equal to 50 per cent. of the total water-holding capacity reckoned on the soil volume). The pots were watered on the scales with a fine spray. The amount of water transpired by the plants was got by deducting the loss of weight in similar fallow pots. To avoid rain, the pots wre placed under cover in the best position available; but, soon after starting, it was evident there was too little light, and the wheat pots were discarded. The growing oats suffered less. The experiments lasted 159 days, starting from 6th September.

At harvest, the crops were cut off close to the ground, and the transpiration ratios calculated out and the results were as follows :—

should then have a transpiration ratio of 725 for oat plants grown in the open. The Indian figure for oats is 870, and it appears likely that 725 more nearly expresses the ratio for the Australian climate than the results given in the table.

In discussing the question of assimilation it has been pointed out that the transpiration ratio is chiefly dependent upon the climate, but that it is not altogether so. In this connection an important practical point was recently established by Dr. J. W. Leather of the Agricultural Research Institute, Pusa. In the dry climate of India the transpiration ratio tends to be high. It was found, however, that crops, in which evavoration is rapid, better use of the water than crops with no manure, as is seen by the decreased ratios in every case.

TABLE III.

	Unmanured.	Manured.
Wheat	850	550
Barley	680	480
Oats	870	550
Peas	830	530
Maize	450	330

The first four are cold weather crops, in which evaporation is rapid, the last a monsoon crop, during which season the atmosphere is humid and moist giving generally low ratios. In discussing the results the author points out that not only does superphosphate have effect in narrowing the ratio, but that nitrates also, if required for plant food, and as might not be anticipated, have a like effect. After an elaborate series of experiments lasting some years, it is stated that "the effect of a suitable manure in aiding the plant to economize water is the most important factor

TABLE II.

	Total Water Lost (159 days).	Excess over Average of Fallow Pots.	Weight of Dry Crop	Transpiration Ratio.
	Grams	Grams.	Grams.	
Pot 4 (Fallow)	12,785	...	...	...
Pot 4' (Fallow)	12,785	...	...	...
Pot 29 (Oats)	17,832	5,075	10·32	492
Pot 29' (Oats)	18,342	5,585	10·76	475

On comparing the results with those given for other countries on Table I., it will be seen that the ratio is higher than those obtained for cereals in Europe, but lower than American and Indian results. It cannot be said, however, that the comparison with the Burnley pots is quite satisfactory. In the earlier stages of growth the crops suffered from undue shading, and in the latter stage from the same influence at certain hours of the day. It has already been mentioned that transpiration is most active in bright light, and practically ceases at night. In connection with this, it would be expected that the transpiration ratio would be higher for plants grown in the open air than in plants partially shaded most of the time. It has recently been shown by Dr. H. Brown that it would be about one-half greater. Accepting this figure instead of the average figure 483, we

which has yet been noticed in relation to transpiration."

In concluding consideration of this subject it should be pointed out that the provision of a pot-culture house, on lines similar to those erected in other countries, is essential if the influence of local conditions upon the water relations of plants in Victoria is to be successfully studied. At Burnley a large number of pot cultures failed owing to the want of suitable equipment, and the results from those few which have been completed have had to be discussed with reserve.

The following conclusions have been arrived at :—

1. In cold humid climates, from 200 to 300 tons of water is lost by transpiration for each ton of dry crop yield.

2. Experiments in different countries indicate that this ratio is increased in drier climates.

3. In Victoria the ratio for crops of moderate development possibly lies somewhere about 700.

4. Suitable manures, by rendering the plants more vigorous, reduce the transpiration ratio, and enable them to make a better use of available moisture.

5. Local conditions indicate that about 600 tons of water (equalls 6in. rain) must pass through a 13-bushel crop of wheat during its period of growth.

(Continued from page 177).

was that at Birchleigh, the results from the point of view of the agriculturist were more satisfactory. The explosions in most cases (except in the holes where specially heavy charges were used to show what could be done, if so desired, for deep trenching purposes) were only just noticeable at the surface, the actual soil displacement being scarcely as great as that of an ordinary mole-hill. But when the soil was opened up, it was found to be fissured and shaken in all directions, and in in those cases where holes were sunk to demonstrate its uses for tre or vine planting, there was a regular pot-hole below, sufficient to satisfy the most exacting. Again, when the holes were left undisturbed, columns of smoke were noticed to gradually rise out of the ground through the cracks and fissures, demonstrating the extent of the underground shock. And all this occurred, though one could almost stand over the hole while the explosion occurred. Of course, no one did so, but that was the impression the operation left on all who were present. At the same time, the shock below ground was distinctly felt for some distance. This seems to be the cardinal difference between using gelignite, a high velocity explosive and this specially prepared agricultural dynamite or low-velocity explosive In this case the ground was very wet and elastic from recent rains, so it is only fair to assume that had the ground been dry, the results would have been even more satisfactory so far as the sub-soil disturbances were concerned, for explosives act with better effect in dry ground.

Another great difference between the methods shown at Birchleigh and those in use by Mr. Quinan, was in the actual implements employed. At Birchleigh an auger was used to make the holes, Mr. Quinan uses an ordinary drill driven into the ground by a heavy hammer. The drill is over an inch in diameter, and is made of the best hardened steel. The drill is over an inch in diameter, and is made of the best hardened steel. The point is set rather short, but it will make its way into anything, short of the very hardest rock, in very quick time. The holes are punched into the soil, and they are made very quickly and at very little cost. The only trouble is getting the drill out again, but that is overcome by a very ingeniously contrived little implement in the shape of a grip, on the fulcrum and lever principle. So that all the outfit needed is one of these specially made drills, a 10-lb. hammer, and the grip. The lever can be supplied on the farm by using a piece of strong hard wood, say an old disselboom, resting on a couple of blocks of similar material. The set complete including hammers for driving the drill into the ground, and appliance for cutting the fuse and fixing the detonators on the cartridges, costs, we understand, something less than £3. And with this a couple of ordinary farm hands, even raw Kaffirs, can make the holes at a great pace, once the selected spots are marked out. After the holes are made, the rest is quite simple. The preparation of the dynamite cartridge is not difficult, consisting of fitting the detonator and fuse. A wooden tamping rod is all that is necessary for setting the charge in the hole, and an ordinary broom-handle serves this purpose. It is necessary to be careful in tamping the charge in the hole, otherwise some of the effect of the explosion may be lost, but all these details can be learned from a special booklet which Mr. Quinan is issuing shortly, and which we had the pleasure of looking over in advance proofs. So that any one wanting fuller particulars can obtain them on writing to the General Manager of the Cape Explosives Works, Somerset West, Cape Province.

The real considerations for the practical agriculturist are, however, not so much the details given above, as the further consideration of how the system there outlined is likely to affect him in his industrial operations All that can be said at this stage is it looks very promising. The actual benefits can only be shown by trial and experiment. This much further can be said, however, that in certain well-recognized and well-known conditions in this country, the use of this method of sub-soiling can only result

in certain advantage. In heavy, stiff, compacted clays, it is bound to act beneficially provided the soils are deep. In those cases where continuous ploughing has left what is known as a "hard pan," it is impossible to conceive of a better or easier method of restoring soil fertility by breaking up the lower strata and thus rendering available the latent stores of plant food. For the establishment of orchards or vineyards, where heavy and expensive trenching work is now necessary, hand spading being the only means available, this system should prove both cheap and effective. In fact in a dozen different ways there should be both advantage and profit in its use. But there are conditions in which its use might, conceivably, be attended with results far from beneficial. And there are other conditions where no benefit might follow though no actual harm would be done. It has always to be remembered that certain classes of soil may not be benefited by the disruption of the lower strata, while others again would be greatly improved. In short, this system needs to be most carefully experimented with except in those cases where the conditions point distinctly to the possibility of improvement. To give two probable cases in point. Some of the Karoo silts in the river valleys of the Cape Province set so hard that the crying need of sub-soiling has been felt for years. In such a case this system should work well. There are others of these same silts so loose and friable that it is doubtfull if any advantage would be gained, even if positive harm did not follow. It must never be forgotten that it is possible to over-drain certain types of soils, just as it is possible to have others too closely impacted. And that is just the one point to be guarded against in this system, for in loose, light, well-drained soils with, say, a gravel or boulder drift bed, there is always the chance of this occuring.

If all that is claimed for this method of opening up soils proves to be correct, and on the face of things there seems little reson to cast doubt upon the statements put forward there is a great future for the system in South Africa. The majority of the practical men who have seen the demonstrations have been convinced that there is a great deal in it, and many have already started trials on a fairly large scale. It is to be hoped that others will follow suit, and not only carry out the work, but keep careful records and let the country know exactly what the results may be when the crops come in. There are many sets of conditions where much could be done, notably in some of the older established lucerne lands, that would bring comparative results in a fairly short time, and we hope to see a set afoot as soon as possible with that object in view. Another set of experiments that should be promising would be the treatment of "brak" soils by this method. Given a sufficiency of water, and this method of sub-soiling, and it would be a very obstinate case of "brak" that would not be improved. This, of course, opens up the allied question of sour or acid soils. But that is too large an issue to be discussed lightly or briefly. No possible harm could, however, accrue from a few carefully arranged experiments, for on their successful result great industrial and even social problems might hinge. Much of the best districts of this country, so far as rainfal is concerned, are more or less "sour" especially near the coast, and if the opening up of the subsoils offered any prospect of palliation, it might pay to bring more of these sections under cultivation, even though they had to be heavily limed to complete the cure. In any case, the use of this particular class of dyamite for agricultural purposes has, we feel, come to stay in South Africa, and it would be as well for all interested in increasing production and restoring soil fertility to watch with care the result of the experimental work now being carried on. The question of costs has been fully gone into, and we can state positively that in most parts of the Union this should not prove prohibitive, but information under this heading, and all other particulars may be obtained on writing to M. Quinan at the address given above.

As far as South Australia is concerned Messrs Chas. Atkins & Co., of Currie Street, are, we believe interested in this question and would no doubt be pleased to supply information.

Oilskin Clothing.

A correspondent writes:—"In the current issue you have an excellent method given on the preparation of oilskin clothing. Would you pardon a suggestion from me which I think would be an improvement? I refer to that portion dealing with the sticking. If it is made with boiled oil it will stick beyond a doubt. A most simple way to overcome it is the following:—Alter the last coat is applied and perfectly dry, them immerse in a bath of clean cold water for three days. The remove and dry in shade. Then apply some warmed vaseline, with a soft rag, working in well, especially where most friction occurs, such as the elbows and shoulders. This I tried myself, and found it by far the best method. A.C. (We are obliged to our correspondent for this note. Ed.)

Interesting Comparisons.

The total area covered by woodlands in Great Britain, both state and privately owned, is but 4 per cent. of the whole area of the land. In France the percentage is 12, in Sweden 27, in Germany 33, and in Russia 61. The state in Germany own 10,000,000 acres of land, and they bring in annually £18,000,000. The German forests maintain a population of 700,000. Of state and privately owned land in Germany there are 35,000,000 acres of reclaimed land, and the average profit is 8/- per acre. The French lands supply to collieries in Wales pitwood to the value of £1,000,000 yearly.

It is estimated that it would cost some £20,000,000 to lay out in plantations the waste lands of Great Britain, and that they would yield from £3 10/- per acre to £6, exclusive of the cost of maintainence. A short while ago the British Government purchased in Argyllshire the Inverlever Estate, of 12,000 acres, at a cost of £30,000, and the land is to be planted with coniferous trees. The ground is merely rough heather and moor, at present treeless and uninhabited. It is calculated that under syatematic forest treatment ten men will be permanently employed for every one man hitherto engaged on the estate.

In the Hartz mountains, a place which does not enjoy any special advantages in regard to weather, soil, or accessibility, the forests yield a steady annual return of 14/- per acre. In Saxony, the net revenue is 22/6 per acre, and many of the forests in the mountains of wild Siberia regularly yield 20/- per acre.

Ostrich Farming.

The U.S.A. Experiment Record condenses an article in the "Yearbook" for 1905 as follows:—"An historical account is given of ostrich-farming in Arizona, and general problems concerned with ostrich-raising are spoken of, such as egg-laying and incubation, feeding and care of the chicks, plucking and sorting feathers, handling and feeding ostriches, and the possible profits of the ostrich industry. Young ostriches, according to the author, are usually kept in troops of 25 to 50, and when a year old the males should be separated from the females. When three years old the birds should be paired, and each pair placed in a separate enclosure. If they are to graze on alfalfa or other green-feed, the enclosure should be large enough to supply them all they need. If given dry feed, the enclosure need only be large enough for exercise. One of the very best feeds for ostriches is alfalfa. One acre of good alfalfa in Arizona will maintain four ostriches without their receiving and additional feed. When pastured or fed on green alfalfa they are always healthy. Ostriches thrive well on any tender green forage, and they prefer the kind they have been taught to eat. Birds fed on hay, when turned out, often refuse to eat grass until they become very hungry. For dry feed, alfalfa or clover-hay cut up, mixed with bran and moistened, is excellent. An ostrich will consume about 3 lb. of hay and 1 lb. of bran daily. They should have gravel and broken bone at all times. Occasionally an ostrich will get a piece of bone lodged in its throat. In such case, if the bone cannot be worked up or down by external manipulation, the throat may be cut, the bone removed, and the incision sewed up. It will heal very quickly. Ostriches may be fed on any kind of grain—corn, wheat, barley, oats or peas. Some farmers feed a little grain while the birds are nesting. Ordinarily, however, if ostriches are in good flesh, and have plenty of good green-feed, they need no grain. Besides, if fed much grain, they are liable to become cross and hard to manage." As regards ostrich-farming as a profitable industry, the author points out that an acre of alfalfa will keep four birds, yielding annually 1.5 lb. of feathers, with an average value of 20 dollars per lb., and 36 to 90 eggs, weighing 3.5 lb., which may be used for incubation or for food; and if the ostriches are sold, which is rarely the case, the price ranges from 100 dollars for six-months, old birds to 800 dollars or more per pair at four years. Ostriches are too valuable for food purposes at present; but it is pointed out that the flesh is said to be much relished by those who have eaten it, while the eggs are palatable when made into omelets, etc.

Locust Beans for Stock.

In point of palatability, locust or carrot beans and bean meal easily rank first on the list of commercial foodstuffs that are at the disposal of the stock-breeder and feeder. Locust beans contain a considerable proportion of saccharine matter, and in consequence have a very sweet taste, for which reason they are exceedingly relished by cattle, and, in fact, by all descriptions of live stock — equine, ovine, and porcine, as well as bovine. Manufacturers of compound feeding-cakes know full well how palatable and tasty this foodstuff proves to stock, and largely make use of it as an ingredient in manufacturing their cake, for the purpose of imparting a sweet and pleasant flavour to it so as to render it of great palatability.

Being very starchy and sugary in character, locust beans are decidedly fattening in their effects when they are fed to cattle in appreciable quantities, say, at the rate of three pounds and more per diem; and they are, therefore, a most useful and suitable concentrated food for cattle that are being fed off for the butcher. Many feeders of cattle make use of them pretty largely and regularly in fattening beasts, using them in conjunction with cake and meals. By mixing some locust beans, or the meal, with other food a most appetizing flavour is imparted to it, and this fact is frequently of the greatest benefit and assistance when beasts are being fed off, as they feed so much better and more readily when they relish their food by means of its pleasant flavour. Thus in making use of locust beans, the feeder is, as it were, killing two birds with one stone, as this food stuff proves useful in two different ways, being both of a fattening effect, and helping to impart special palatability to other food. It should not, however, be forgotten that locust beans when given with too liberal a hand may clog the apptite on account of their sweetness, and the feeder must be careful not to exceed a reasonable allowance in apportioning the amount of this foodstuff that is fed to the cattle.

It would be difficult to say whether locust beans in a kibbled state or in meal form are superior for feeding purposes; practically there is very little or nothing to choose between the two, and this question is mainly a matter of opinion, some feeders preferring to use kibbled locust beans, while others are partial to the meal form. The meal is, it may be mentioned, liable to adulteration.

Locust beans are at times useful as a condimental food for dairy cows, and a few handfuls may be mixed with food in order to render it more appetizing for the cows. They are not, however, a milk-making food, and it would be uneconomical to feed an appreciable quantity to milch cows. The foodstuff is essentially suitable and of value as a food for feeding and fattening beasts only. But as a condimental food—that is to say, in so far as regards its great and unusual palatability — it is of usefulness for all kinds of farm stock.

Poultry Notes

Roup.

There are several forms in which his highly infectious disease may ppear in the poultry yard, and on his account is very confusing to he novice.

The commonest form is a purulent attarhal disease, attacking the embranous lining of the mouth, hroat and nose, which causes a hickening of the secretions, and iterferes with the breathing, causng a husky cough and sneeze. rothy bubbles appear in the mouth nd with the advance of the disease he lachrymal ducts get choked, ith the result that the bubbles re forced out at the corners of he eyes too.

The second form is generally ermed diptheric, and often follows n the neglect of the catarrhal orm, though it also appears withut being preceded by the first orm, and in my experience is a retty sure indication of a tuberular bird.

The third form is distinctly a ubercular disease, wherein cancerous and tubercular growths apear, and in this form is highly ontagious and hereditary.

The first form arises from a cold, roduced by a draughty house, aulty ventilation, damp quarters, r a situation exposed to wind and ain.

The second form is the direct utcome of filth as a general rule, which sets up septic poisoning of he blood, caused by having to reathe the invitiated and polluted ir of a dark, dirty and damp fowlhouse, or a filthy damp run, in fact any insanitary condition is a predisposing cause. Defective nutrition, arising from a deficiency of nitrogeneous matter, with excess of carbonaceous or the lack of saline matter in the food are undoubtedly powerful predisposing causes also.

The third form will follow the other two on account of their devitalizing influences, rendering the bird a fit subject for the development of the tubercle bacillus, which everywhere, and particularly so where uncleanliness exists, and of course may be latent in the system of the bird, only requiring an invitiated condition of the flesh and blood to bring it into active life, then setting up acute tuberculosis in some of its many forms.

There are two factors at work in the transmission of the disease, and they are the infective and receptive. The germ is the same, yet the disease is not always equally virulent, and no doubt this is influenced by the conditions under which it is developed, for where a virulent form exists it rapidly spreads to the whole flock, while on the other hand birds will be found sound and healthy where others have it in a mild form.

There are other existing causes which devitalize the system of the birds and make them susceptible to the disease, chief of which is impoverishment of the system by lack of food, and improper or bad feeding. This cause prevails here during, and to the latter end of summer, where green food has not been given is sufficient quantity to keep the birds' health up. Then, of course, there are vermin (the tick, the louse and the mite), which, if allowed to exist, will undermine the health of your birds.

Roup proper can be distinguished from a simple catarrh by the fact that the former has a highly disagreeable odor, and in the last form, it is always accompanied by ulcerated mouths and growths forming in the head, eye or neck, and sometimes in other parts of the body.

The latter form, is a most dangerous and undesirable subject, and for your own future success and the welfare of poultry breeding, you should always kill and burn all such birds. There is no getting away from the fact that birds which have once been attacked with a severe type of roup are never the same, though you may not see it, it will come out in the next generation. Herein lies the secret of weakly chicks, and whatever you do with such birds; it is not right to sell eggs from them for incubating nor to dispose of any of the birds either, and thereby spreading the trouble to your own detriment as well as to others.

Roup is most difficult to eradicate if once it gets hold of a place, which is a good reason why every bird on manifesting sure symptons should at once be destroyed, no matter how valuable. The discharge of mucous matter from the membranes gets thrown all over the houses and yards by the sick birds shaking their heads to throw it off: and being highly infectious there is no wonder then that we hear of so many getting their stock wiped out for them.

The treatment of roup has to be studied according to the stage it has reached and the severity of

the attack. With the catarrhal form you can effect a cure by washing the mouth, nostrils and eyes with warm water and Condy's fluid, in its first stages. In the later stages, or diptheric form, you must also remove the cheesy growths which have collected in the throat, and mouth, and then paint the parts with kerosene. Alcohol, such as whiskey or brandy, diluted with water can be used for cleansing the mouth; and to be successful in the treatment of roup you must give persistent attention to your stock, for at least two or three times a day; the mouth and nostrils require washing.

All affected birds must be kept in clean and comfortable quarters, and fed on soft food. An equable temperature of about sixty degrees is best to maintain where the sick birds are.

An effectual treatment we have seen used in the early stages of roup, is to give a peppercorn every day, or a pill made of lard, flour, mustard and cayenne. The drinking water should have a little sulphate of iron added as a tonic, and one drop of creosote to every pint of water, which acts as a grand antiseptic and preserver of animal tissues.

To minimise the spread of roup observe absolute cleanliness, and in the case of back yards or small runs the droppings should be removed every morning, and the sleeping quarters kept sweet and clean.

Where the majority of poultry keepers who get this trouble in an aggravated form fail, is to realise the great importance of removing a sick bird from the healthy ones the moment it is noticed. In many cases do we find the diseased birds at liberty with the whole flock. Can it be wondered at then that the whole lot go bad some day, and this particularly so where birds are poorly fed and neglected.

In England and America roup is most evident in the damp and winter season, whereas here its ravages are mostly felt when we get well into the hot weather and always mostly towards the end of the dry season.

I am clearly of opinion that the lack of proper nourishment has much to do with the origin of this malady, as well as the predisposing causes mentioned. During the winter season in England and America, and during the hot season here, is the time that natural green stuff and animal life is scarce, consequently the fowls are denied the best life-giving constituents; unless it be that their owner thoroughly understands these natural phenomena and make up for it by supplying artificially what they require to maintain normal health and strength. I meet the question occasionally, why is it Mr. So and so never seems to get roup in his yards! I say, simply because he feeds well, tends to the creature comforts of his flock, does not allow his place to become foul or dirty and sees to it that they have ample fresh green food regularly, and a little fresh butcher's offal occasionally.

Reverting to the treatment of the diptheric form, the ulcerated parts should be painted with the following lotion :—

Carbolic Ac.	... 1	drachm
Sulphurous Ac. Sol.	3	drachms
Tinct Per Iron	... 4	drachms
Glycerine	... 4	drachms

Care should be taken that none of the lotion gets over the birds throat. It can be put on with a fine camel hair pen, or a feather, and these should be carefully protected when out of use, and burned when done with.

It is generally advisable when a bird is convalescent to build them up as soon as possible by giving nourishing food, and a little Parrishes, or Cod liver oil.

The tuberculosed birds are easily marked by the fact they soon go light and get emaciated. Consumption or liver disease are either or both present, and if they assume a rapid course the bird soon succumbs. If such birds should be temporarily restored to health, they should never be bred from, and are unsound as human food. They are a serious menace to your flock, and if you retain them you will assuredly have much trouble; and this I must here impress on breeders is the reason of so much disease in certain yards.

Moreover, when the tuberculosis is in the liver, it is claimed by authorities that the bacilli will reach the oviduct, consequently will become incorporated in the white of the egg and probably in the yolk too. Where is the limit to trouble then? With experience I have been won over to absolute belief in this hypothesis, and on that account must strongly counsel breeders here to give over retaining this trouble but use the axe and see that all bodies are buried deeply, or consumed by fire, so that there is no possibility of clean birds coming in contact with them.—"Fanciers' Gazette."

The chirp of a happy chick is pleasant, but the cry of the comfortless is worse than a tin whistle.

Chicks, like children don't want coddling. Warmth, fresh air, sunshine, exercise, and food is all they ask for. Don't forget the fresh air and sunshine and exercise and warmth—see?

Warmth for the first few days is perhaps, the most important, with pure air, but don't roast them. That should come later.

Breeding Table Birds.

In producing table fowls, the primary consideration is rapidity of growth and the proper distribution and quality of flesh. In this direction first crosses are of great value—i.e., a cross between two pure breeds, which results in strong vigorous chickens able to withstand the amount of forcing necessary to prepare them for the market in the shortest possible time. The more quickly the birds mature, the more profit will be made. The birds should be ready for market at from 16 to 20 weeks from the time of hatching. The temperament of the breeds selected should also be considered—a restless, active breed will not fatten well, and should therefore be avoided. The following will be found among the best crosses for the purpose:—An Indian Game cockerel with any of the following hens: Dorkings, Faverolles, Orpingtons, and Wyandottes. All the above are very docile, and will give excellent results. In selecting the birds, care must be taken to choose those specimens showing the best table properties—viz., short-legged, blocky birds with fine bone and having good round full breasts. The progeny from these will mature much more quickly than those from long-legged heavy-boned birds. Care must be taken to breed only from strong robust birds, those that mature most quickly, and that have also been bred from quickly maturing ancestors. The above are specially recommended for table birds.

— Feeding. —

To get the quickest returns, the birds should be fed largely on soft food, as it is more easily assimilated than hard grain. For the first week, feed every two hours, hard-boiled eggs, and stale bread crumbs alternately with small seeds, such as panicum or small millets. Then leave off the egg and bread crumbs, and substitute a mash consisting of 1 part bran and 2 parts pollard mixed into a crumbly mass, not sticky, with hot separated milk. After three weeks, a little cracked maize and wheat will be relished by the chickens. Four feeds a day will now be sufficient, two of which should be bran and pollard. A little Sunlight oilcake mixed with the latter every other time will give variety. Feed a little fresh meat or green bone once a day, as nothing else will make them grow so quickly. Give the chickens all the run possible during the first three months, then place them in small yards in limited numbers. This is to retard their exercise; otherwise they will not fatten, and a large amount of food will be utilised in making muscle rather than flesh. Give plenty of green food, lucerne for preference, and as much separated milk as they will drink. Keep clean, cool water always before them. Plenty of good sharp grit and crushed oyster shells are indispensable. Crushed charcoal will also be beneficial in keeping the crops sweet and preventing diarrhoea. During the last fortnight, the birds should be put in coops and fed on soft food only, to which should be added 5 per cent. of coarse fat or suet. This should be fed three times a day, as much as they will eat. The birds should now be kept in semi-darkness between feeds; this will keep them quiet. With the above treatment they should be prime condition in 20 weeks.

Compating Mites and Lice on Poultry.

There are several varieties of lice that attack poultry. They subsist mainly on the feathers, and perhaps an the epidermal scales. They are found largely on the head and neck, under the wings and about the vent, and when present in large numbers they cause the fowls much discomfort. Pyrethrum, or Persian insect powder, powdered sulphur, and some of the various preparations on the market, such as the louse powders, are good in combating these pests. The hens can be dusted with one of these powders after they have gone to roost. Have the powder in a box with a perforated cover, grasp the fowl by the legs, and shake the powder well among the feathers. Dust at least three times, at intervals of about a week, in order to catch the lice which hatch out after the first dusting. The mites subsist on the blood of the fowls, and are not usually found on the bodies of the bird, except when at roost or on the nest. During the day they inhabit cracks and crevices of the walls, roosts, and nests. Sitting hens are often so annoyed that they are compelled to leave the nest in order to relieve themselves of these parasites. The free use of kerosene about the nests and perches is useful in fighting the mites. The walls of the house may be sprayed with kerosene, the operation being repeated every three or four days for two weeks. Insect powders are of little avail.

The following method has proved excellent in ridding houses of mites and lice when the weather conditions are such as to permit the birds being kept outside the house for five or six hours: Close all the doors and windows, and see that there are no cracks or other openings to admit air. Get an iron vessel and set it on gravel or sand near the centre of the house; place a handful of shavings in the vessel, saturate this with kerosene oil, and then sprinkle on the top of the shavings a quantity of sulphur, estimated at the rate of 1 lb. to every 80 or 100 square feet of floor space. Instead of using the shavings and kersene, the sulphur can be saturated with wood alcohol. When everything else is in readiness, light the material and hastily leave the house. There is very little danger of fire when proper precautions have been taken to have plenty of soil beneath the vessel. Allow the house to remain closed for three or four hours, at the end of which time one can safely conclude that there are no living beings inside. Now throw all the doors and windows wide open, so as to drive out the sulphur fumes thoroughly, and then the fowls may be allowed to enter. Let them in one by one, and as each enters catch it and dust it well with insect powder, which will destroy the pests on the birds.

Tobacco dust is also good to use instead of insect powder. The birds and house will have been freed from vermin for a time, but the eggs of the insects have not been destroyed, and in a week another swarm will be hatched out. Therefore, it will be necessary to repeat the operation once or twice before the pests are exterminated. After this, care should be taken to see that no strange fowl be admitted to the house or yard without having been thoroughly rid of lice, as one affected hen will contaminate all the rest.—"Agricultural News."

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Period of Mating for Fertility.

The following experiment was undertaken to determine how soon after mating eggs became sufficiently fertile to yield chicks says the Rural World :—For this purpose there were selected twenty Plymouth Rock hens one year old, that had been laying heavily during the five to seven months preceding, but had not been in the company of male birds since they were young chickens. Late on the evening of May 25th a cockerel twelve months old was placed in the pen with them, and kept there until the close of the test. The eggs laid each succeeding day until June the 6th were incubated. The eleven eggs laid May the 26th were all removed after being in the incubator eight days. Eight of them were clear, and the three others showed very slight traces of fertility. At the same time the eight eggs laid May the 27th were examined, and three of them showed clear, three were slightly cloudy, and two had good strong centres and radiating lines. From these eggs two good strong chicks were hatched on the twentieth day of incubation. The best results were obtained from the eggs laid on June the 2nd, eight days after the introduction of the male bird. From the twelve eggs laid that day ten good chicks were hatched and two eggs were complet-l-- infertile. These tests shows that development may commence early for eggs laid by two of, the hens on May the 27th, not more than 40 hours after mating, yielded vigorous chicks.

Winter Feeding of Poultry.

The best results cannot be achieved, either with laying hens or growing stock, if the same foods are employed throughout the year ; yet many practical poultry-keepers make the serious mistake of using identically the same meals and grains during the cold as during the hot weather, apparently oblivious to the fact that certain foods are only suitable for summer, while others give better results during the winter months. With the season of the year the diet of the fowls should be varied, as this not only assists in keeping them healthier, and consequently more profitable, but in many instances food is actually saved. It is a fact needing no proof that if the same foods are used week after week, and month after month, the birds become satiated, and do not eat so readily as healthy and vigorous birds should.

The most suitable foods for winter use are those containing a fairly high proportion of carbohydrates, this being the element that assists in the production of heat, and as far as possible foods should be selected that contain somewhere in the neighbourhood of 65 per cent. For summer use 55 per cent. is ample. The fat, while it assists in the production of heat, has a fattening effect, and the proportion should not vary greatly between winter and summer : for fattening birds the food should contain about 5 per cent., and for laying hens or growing stock about 2 per cent. The remaining essential element is albuminoids, or nitrogenous matter, which goes to the formation of bone, feathers, muscle, blood, eggs, and the like. Young stock or laying hens require a more generous proportion than fattening or other classes of fowls, and the food for the former should contain about 15 per cent., and for the latter 12 per cent.

Barleymeal is an extremely useful food for cold weather, as it is fairly strong in carbohydrates and fat. Mixed with middlings in the proportion of two of the former to one of the latter it makes an excellent ration, one upon which the birds do exceedingly will. Barleymeal is not so extensively used as it might be with advantage, and many people appear to prefer middlings, under the impression that it is cheaper. Maizemeal in small quantities gives good results but it should be only sparingly used, not more than one part to five or six of the barleymeal and middlings. In larger quantities it produces fat too quickly at the expense of eggs and flesh. Pea and bean meals are very strong in albuminoids, and are therefore of no particular use for winter ; the excess of nitrogenous matter, however, assists in the formation of eggs.

First thing in the morning, when the crops and intestines of the birds are quite or almost empty, it is advisable to give mash, as this is so much more easily assimilated than grain. During cold weather it should be supplied warm, because it is obvious that if a large quantity of cold water is taken into the system more of the food will be required to maintain the bodily temperature, thus leaving less for the production of eggs. When the weather is hot cold mash may be great, but rather than allow the birds to eat it in this condition during the winter I would feed on grain alone. If it is possible to make arrangements for cooking the food overnight so much the better, as this renders it considerably more digestible, besides saving the labour of preparing it first thing in the morning, when there is nearly always somewhat of a rush to get all the feeding over before breakfast. Excellent steamers or cookers can be bought very reasonably ;

The cooker is extremely useful for other purposes, such as steaming clover hay, soaking grain, or cooking small potatoes, or household scraps for mixing with the morning mash.

In ths afternoon hard grain should be employed, for the op-

posite reason to that for supplying mash in the morning; in this case a food is required that takes a long time to digest, so as to last the birds through the night, in winter sometimes thirteen or fourteen hours long. Wheat, barley, and a very little maize are the most suitable grains for the purpose. The last-mentioned needs to be used carefully, and should only be given in very small quantities, and then only when the weather is cold. As already indicated, maize has the effect of producing fat rather than eggs, and thus is unsuitable for laying hens or stock birds. It is unwise to mix the grains together, as in the case of barley and maize, for instance, the birds eat all the latter and leave the barley, of which they are not particularly fond; the better plan is to supply the grains separately, thereby ensuring the birds receiving a proper supply.

Some poultry-keepers are in the habit of providing their hens very liberally with stimulants, in the hope—sometimes a false one—that egg production will thereby be greatly encouraged. Stimulants undoubtedly serve a very useful purpose, but they must be used with care, as if overdone they probably do more harm than good. In no circumstances should the directions be disobeyed, and a larger supply given to the hens, as it is evident that the manufacturers are not likely to err on the side of recommending too little. A striking instance of this came under my notice a little while ago A poultry-keeper secured a fairly large supply of one of the well-known powders, and in the directions is stated that so much was to be supplied on alternate mornings. He conceived the brilliant idea that if he provided the birds with the same quantity every morning he would procure, if not twice the number of eggs, at all events a much larger supply. As any practical man will guess, he quickly ruined the digestions of his hens, and he actually obtained in the long run considerably fewer eggs. A small quantity during very cold weather, or with rather backyard birds, is to be recommended, but its constant use is by no means advocated. The best method of giving the powder is by mixing it with the morning mash, as in this manner each bird receives an equal share. "Poultry."

Fowls for Everybody.

If you have a back yard in town you can keep from six to a dozen laying hens, and if you have a suburban allotment of from quarter to one acre, then you could keep up to 100 hens, and then the mistress of the house could be adding a little to the income from the proceeds of the sale of eggs.

From the kitchen of every household there is sufficient refuse to keep a few fowls, which consequently keeps down the feed bill.

Those keeping a small number of hens in a backyard for egg production should never have a rooster with them, for the following reasons:—You will get a better percentage of eggs without him. The eggs, not being fertilized will keep longer and better.

Another hen could be kept in place of him (the rooster), thereby giving you more eggs. His crowing propensities are often objectionable. Lastly, chicks off him are no use to you, as they can never get proper justice reared in a back yard.

The plan is to replenish your yard every second year, by buying in six to eight months old pullets.

This same course can be profitably adopted by those who go in for egg production on a large scale, and who have not a satisfactory run to breed and rear birds on.

Then, again, no one living in the country, or anywhere in the bush, should be without a few fowls, for there is no more absurd proceeding, to our mind, than that of a person living in the country going to the store for eggs, while they are throwing away refuse from the kitchen which would produce them eggs, along with the vegetation and herbage growing about, which is equal to half a fowl's dietary when they can get it.

At this season all will be busy hatching, or putting down eggs for that purpose. During these months the atmospheric conditions are conducive to good results, as the temperature is fairly equable, and the necessary moisture is available, that is for hatching naturally under birds. With the incubators, of course, the conditions are produced artificially at pleasure in cold or warm weather.

In setting a fowl it is preferable to have them on the ground, either in a vacant shed or under a bush. Select the situation with the open side facing the east, so that the hen will get a little of the early morning sun, but otherwise roughly shaded, and protected from other fowls or vermin. Firm soil is best, and to prepare the nest you should scoop out a hollow about the size of the fowl to about two to three incher deep, and fill in with a fair quantity of fine straw or hay.

In removing a clucky hen to your nest it should be done under cover of darkness, and immediately before doing so you should take a shovel and fill with soil, and heat over fire till warm enough to handle, and place under straw in nest. Then warm a few china or dummy eggs and place in nest. Then you can carefully remove the hen and place on her new nest. Some readers will say, why this trouble in warming the soil and the eggs. Well it ensures you of the hen taking kindly to her new nest, and now some of you will see the secret of your nonsuccess on previous occasions, when hens absolutely would not settle down on new cold eggs, the temperature being about 40 degrees, while the nest you took her off was 103 deg. After your clucky has settled down and you come to give her her proper eggs, it is also advisable to warm them before placing them underneath her.

It is attention to all the minor points such as these that ensures better results.

If at all possible, the run or locality where a hen is set should have green feed of some sort growing about, so that she can have what she wants, and always have a tray with some wheat and a dish of fresh water beside her and you need not trouble about her much. Grain is preferable for sitting hens. Soft food causes scours, which is very irritating to the bird, and is the reason of many forsaking their nest.

Pigeon Notes.

Diseases of Pigeons.

"From the Pigeon."

In a healthy pigeon the feathers should be close-fitting and the ground-colour clear and clean.

In self-coloured birds the bars should stand out clear and well. Any dulness of one colour against the other is an indication that all is not right.

Pigeons' feet should be moderately cool, and the colour of the legs and feet clear and bright.

When the colour of the feet is pale and dull, combined with dull plumage, it is a sure sign all is not well.

The eye is an important factor from which health or condition can be judged.

The experienced fancier can learn much from the eyes of his pigeons. They appear to speak to him and tell him just how the subject feels. Immediately the birds become sick the eye indicates the trouble sooner than anything. A clear bright eye is the surest indication of health, and as soon as a fancier can understand reading the health of his pigeons through the optic organs he has learnt much.

Now let us examine the mouth and throat.

In young and old the most common disease amongst pigeons is throat trouble.

Open the beak examine the throat well, and look for a small yellow spot

If these or yellowgrowths are to be found anywhere in the mouth it is a certain indication that the blood is diseased.

In young birds of from four or five weeks old canker is very common e ther in the pharynx or mouth. When the surface can be got at, it can be treated and cured; but if the growth is low in the pharynx treatment is very difficult, and it is best to kill the subject.

Examine the qeak. It should be dry and free from stain.

Should there be any indication on the beak of stain under the wattle, carefully press the wattles and see if there is any mucous discharge. Catarrh and one-eyed cold show themselves first in this form.

Birds in good health are lively, vivacious, their feathers tight and close-fitting, appetites good, droppings firm and clean, nicely tipped with urine, which is the white against the coloured ground of the droppings.

Too much importance cannot be attached to the examination of the excretions in order to judge as to the health or disease of subjects.

Green, watery, foetid droppings are a sure sign that the health of the bird is faulty.

Small, clear, pebbly excretions from youngsters in the nest and old birds is a sign that the food is right, and that they are thriving.

Once learn exactly how the subject should be in its normal state, and you will readily appreciate when disease is present. A pigeon is diseased when any of its functions are not carried on in a normal manner, when there are unusual growths, injuries, or parasites affecting any of the organs.

One of the most important habits to acquire is to look at a bird not as an individual object but as an individual made of many parts, each of which has its special function to perform.

Thus the beak, the tongue, the oesophagus, the crop, the ventricle succulent, the liver, the gizzard, the gall, the duodenum pancreas, the small intestine, the caecum, the large intestine, the ureters, the oviduct, and the rectum all perform their respective parts to give nutrition to the subject.

The health, the condition, and the very life of a pigeon depends upon the organs of nutrition doing their work well and effectively.

After being eaten the food pass into the crop.

The crop is simply a store to e able a bird to carry food from i feeding ground to its nest.

From the crop the food passes in the stomach (ventricle succulent).

Viewed from the front, this has t appearance of a small subterranea passage leading from the crop to t gizzard.

In the crop the grain becom softened and swollen in the wat mixed with it. After this and duri its passage through the stomach the gizzard it is impregnated wi gastric juice. It then passes into t gizzard, which is really the seco stomach, or last stage of corn in i complete form, for although swoll in the crop and mixed with gast juice in the stomach, it remains who corn, and affords no nourishment the bird until it reaches the gizzar The gazzard is the true jaw of t pigeon and here it is that digesti has its seat of action. In the gizza by the help of grit and its contractio corn is reduced to a pulp and aft wards discharged into the intestin The intestines are composed of t parts, the small and the large testine. The small intestine is long narrow tube folded many tim The large intestine is the last sta of the food. The digestive canal t minates at the rectum.

I took upon the organs of nutriti as amongst the most important pigeons. Let these be deranged in e so slight a maner, loss of power mediately follows, for the blood comes disordered, leading to inaniti

A free, easy digestion is the sur sign that birds are in good health.

A full crop at night and an em crop in the morning, with sou healthy excretions in the nest-bo or on the floor of the loft is a ha augury for the fancier for his bi are well.

The very first symptoms that organs are deranged is the remain of food in the crop beyond normal time.

Take as an example the hen t has just laid her eggs.

Generally it will be found that forty-eight hours after laying dibestion is slow, and the crop contain food in the morning taken of the previous night.

Besides the organs of nutrition find in a bird's body the nost larynx, trachea, lungs and air s which together constitute the resp tory apparatus.

The principle functions of this paratus are to supply oxygen to blood, and receive in return carb acid gas and watery vapour.

Then we have the circulatory paratus, composed of the he arteries, capillaries, veins, and l

hatics, which carries the nutriment nd the oxygen to every part of the ody, and brings away the waste and ast-off material.

A liberal covering on the floor of our lofts of good sawdust to the epth of half an inch will be helpful checking insects and vermin among our birds.

The depth is necessary, because if read too thinly, directly any of the rds rise to fly, or even flap their ngs, they will blow it all into laces on the floor, besides causing it enter the eyes of other birds, and us producing inflammation; but if lf an inch deep none will rise, but l will lie "dead" on the floor.

Ticks, lice, fleas, etc., are dreadful rments to pigeons if allowed to cumulate, which they will do if the oppings are allowed to remain in aps.

Have your lofts roomy, well lighted d amply ventilated; without aught, though.

Pigeons are nearly all perfectly rdy as regards cold, and will care r themselves as regards rain, but e tender in regard to draughts.

Have your perches about 5in. from all by $2\frac{1}{2}$in. wide and 10in. apart, ith corners rounded off to prevent jury while flying.

— Food. —

As regards food, maples, tick beans d tares constitute the staple diet, ith a relish of barley, dari, hemp-ed and canary. Cleanliness above l things in the houses right through conjunction with regularity in feed-g, will ensure success so far as ealth of stock is concerned.

— Off Colours. —

In conclusion, a thought towards e growing demand for off colours worthy of serious consideration om many points of view. The blue, ow long and well established, can y claim to a wide market, which is ot surprising, since the variety esents a lovely spectacle mustered large or small numbers.

The rapid strides of silvers made in cent years have brought the colour to a highly honourable position. ey have command of widespread vour, and are continually linking sh recruits to their forces. The ly improvement on the choicest of is colour lies in the beak, which, en produced jet black, will place the "queen of all." The fabulous ices paid for single specimens of is blend of either sex provide ple proof of its popularity.

With the mealy, its charm and at-action have produced quite an army followers, who cling to their choice many reasons, amongst which is be found stability of quali . upled with value for cross-colour iring. Like its compani ns, dis-inguished honours have been gained the classics above all other rieties of pigeons. Safty is thus ured of the continued advance, of is colour.

Yellows are a colour that have travelled fast upon the road with apparent success. Classes for "Any other colour" are more than likely to contain representatives of this species at every show.

The remainder of the off colours are growing in numbers, quality and demand so one can safely venture to support either. Encouraging prices continually reported from north, south, east and west, and their attractive appearance, combined with the premier club's earnest endeavour, should amply satisfy the mind, and erase any doubt of their winning powers or marketable value.

— The Suppression of Faking. —

It cannot be necessary to plead in this small article for support to honest and straightforward principles, but faking has gained so fast a hold that it becomes a task to close without a word of warning. Let our hobby be free from the dastardly cruel ways of deceit, that the honours gained may be looked upon as those secured under pure and sportsmanlike conditions. Show your birds as they are, not make them what they ought to be.

Victorian Pigeon Club.

— A Brilliant Function —

As shown in the last issue of the G. & F., the North Suburban show was in many ways a record and a great spectacle, but I think that the show under consideration bears off the palm, as against all its rivals and predecessors. Quantity and quality both were there, and I for one feel that pigeons in Victoria are not only on the upgrade, but have reached a level never before attained. A feature of the show was the great number of sales of birds at the catalogue price. Besides this, I know that very many private sales took place.

There were in all 23 cups, trophies, and specials competed for, which is, I think, a record in itself. As I feared, the Fantail class did not get the support it deserved from the Fantail Club, but the future may see this altered.

Specials were won as follows:—Pouters, F. Crotty; Dragons, R. J. Courtnay; Fantails, F. Crotty (two cups) and W. Wheeler also two cups; Jacobins, W. Hearne, snr.; Turbits, J. Guest; English Owls, Messrs. C. Hall and A. Stewart; African Owls, G. S. Sanderson; Saddlebacks, T. P. Hendrie and G. Shee; Magpies, G. J. Mead; Short-faced Tumblers, Donald Seddon (including best pigeon in show); Long-faced Tumblers, Master Rewi Fallu; Archangels, Claude Hall; Homers, Ernest Mills, H. Nixon, McFarlane and Read, W. Sinclair.

Besides the winners above mentioned there were a great many who gained prizes, some winners walking off with many firsts, although they happened to miss specials. Among there were Mr. Claude Hall, who swept the board in Archangels; Mr. Mansfield, who rivalled Mr. Courtnay in Dragons; Mr. Ingram, who did very well in Saddles; and Messrs. Searle and Wellington, who each did exceedingly well in Tumblers.

On the whole the judging gave satisfaction, the only thing in the nature of trouble occurring in the Magpie section. In Black Hens, and in Yellow Hens the judge at first awarded only the first prize, the other birds in the class being passed because they were rung with the wrong ring, although they were adult birds and bore adult rings. Naturally a protest was entered, and the committee, after a few minutes' deliberation, ordered the classes concerned to be judged again.

The result of the committee's decision in this case is that the ring on adult birds does not matter, and that it is immaterial whether adult birds are rung or not.

Interstate competition was keen, and I was glad to notice that birds from New South Wales, Adelaide and Tasmania did their fair share in taking honours.

It will be of interest to pigeon fanciers generally to learn that the Royal Agricultural Society of Victoria, for the first time in its history, is providing classes for pigeons. The prizes are good, but for some unscrutable reason the Homers are catered for in a more liberal way than the fancy birds. The prizes are 15/-, 10/-, and 5/- for Homers, and 10/-, 5/- and card for the fancy birds. However, it is not for us to look a gift horse in the mouth, but be thankful for a good classification, and to trust that time will equalize things in the matter of the rival varieties.

Rheumatism in Pigeons.

As some of the symptons of rheumatism closely resemble those of leg weakness it may be mistaken for the latter at first sight, but a little observation will soon show that the trouble is of quite a different nature, and that it has been brougnt about by altogether different causes. The similarity exists in the patient losing wholly or in part the use of the legs; but, except in very bad cases, it is generally found that only one of the legs is so affected. Lameness is the first indication, and the bird squatting down to rest after a few steps have been taken. Then it will be seen that the appetite becomes affected and in addition feverishnes is shown, and the bird is inclined to drink more than is the case in the former complaint or is good for it. If now a thorough examination is made, other and more conclusive symptoms may become apparent. Thus when the bird is taken in hand it will generally be found that the seat of the trouble is at one of the joints, which soon becomes inflamed and tender, much pain being evinced when the place is touched and shown by the bird flinching and endeavouring to escape from contact with the hand. Following this closely, and more especially if the case is ignored or neglected, the joint becomes swollen and stiff, the lameness becomes more pronounced, and if both legs are affected the patient may even lose all power of movement and squat about helplessly upon the ground.

In such cases the patient should be removed from the loft to prevent molestation by the other birds, and be kept quiet on a bed of soft hay. In treating for this complaint it will be found advantageous to apply both outward and internal remedies. For the former it has generally been found that painting the affected part with tincture of iodine will give relief, but should this prove ineffective after being used for about a week, some other preparation should be given a trial such as Elliman's Embrocation or a simple liniment composed of oil of turpentine and camphorated oil in equal quantites, which should be well shaken before it is applied to the joint. For internal treatment a little cooling medicine, such as Epsom salts, will be found most beneficial and tend to cool and purify the blood, while a pill containing two or three grains of salicyiate of soda has also been found of great service with birds suffering from th s complaint.

So far I have only spoken of the treatment to be followed, but, as I have said many times before, prevention is better than cure, and as the next few months may be rather prolific in such cases it might be well to see what are the chief causes of the disease.

In some, and I am inclined to think a great many, cases it may be found that there is an hereditary tendency, but the immediate cause of its appearance may in most cases be traced to some defects in the building of the loft, whereby the birds are exposed to damp and draught. Then again, with Homers the exposure to wind and weather when the bird is tired and hungry, as will sometimes happen during a journey when driven out of its course by wind or storm, or obliged to settle for the night on some cold housetop, may also bring on an attack of this disease, but as a rule in cases of this kind it is the wings that are the seat of the trouble more often than the legs.

It is of the greatest importance to make certain that the loft is made wind and rain proof. Other precaution may be well taken as far as the loft is concerned, and that is to see that the highest shelves or perches are arranged so as not to be in a direct line with ventilating holes or apertures, for if thus placed the birds resting upon them at night will be exposed to a direct cold current, which will not be to their advantage either in respect to this disaese or to that of roup and kindred ailments. The floor, too, should be kept as dry as possible by means of a covering of sawdust where the flooring is of wood, or sand when the floor is of earth or cement, and that the covering material is removed as soon as there are any indications of dampness or foulness observed and a fresh supply of the dried material put down.—Feathered World.

Place a 10in. board slightly slanting under your perches, as it saves a little time in cleaning.

The best nest-pans are those made of rough earthware. The size for ordinary pigeons is 8in. across, for Carriers, Pouters, and Runts 10in.

Ventilation must be thoroughly provided for.

— Commonwealth Year-Book. —

From the Commonwealth Statistician (Mr. G. H. Knibbs) we have received a copy of the official Year Book of the Commonwealth for 1910-1. We have in former years made commendatory reference to this valuable annual volume, and as the latest edition is equal in every respect to previous issues, it is unnecessary to comment on it. Statistics, to the average mind, are pretty "dry" reading, but Mr. Knibbs so clothes his valuable facts and figures that they are readily assimilable by even the superficial mind. This volume furnishes corrected statistics for the whole period of Australian settlement, viz from 1788 to 1911. In addition to purely statistical matter, the publication contains special articles dealing at length with some particular subjects or subjects of more or less permanent interest. The 1911 edition contains several new features.

Home Notes.

How to Nurse.

A sick room should have little furniture; a single bed is better than a double one. It is important that the chimney should be clear. In place of fireirons there should be a wooden poker; and the coal, wrapped in paper in pound packets, to be put on without noise. Cheerful pictures on the wall, often changed. Oil-painted walls are better than papers of distracting patterns. A fire is the best ventilator. Doors are made to shut, windows to open. Air without draught is what is needed.

The room should be kept clean by dusting with a damp cloth, rubbing the floors in the same way. The less carpet the better. Fresh flowers are not deleterious. Visitors should sit between the door and the patient getting the benefit of the air, and not between him and the fire, thus getting in the direct current of foul air rushing towards the fireplace; they should be well in sight of the patient, and never be admitted at meal times.

Amateur nurses should not show over-anxiety to hover continually over the patient, asking what they will take or wear creaking boots or rustling silks, or be bustling or fussy, nor stealthy nor catlike, and whispering should be mercilessly tabooed. A nurse should be of all things cheerful, compassionate, kind but never sentimental. Decision and firmness are needed.

Medicine must be given with the regularity of clockwork. A sick-room should be kept tidy; plates, cups, etc., that have been used should be turned out at once. In cases of faintness, where stimulants are not ordered, the patient should be made to sip some liquid slowly; the mere effort of sipping accelerates the action of the heart. A reaction is setting in against beef tea; to make it veritably nutritious it should be mixed with farinaceous food. Milk is the most nutritive of all such diets.

The several symptoms should be written down by the nurse from time to time on a slip of paper, always at hand, for the doctor. In infectious disorders nothing should be kept in the room except for use. Clothes in a wardrobe under such circumstances have been known to spread infection ten years after. A sheet should be kept suspended outside the door always wet by keeping one end dipped in carbolic or Sanitas. Handkerchiefs should be replaced by rags, burnt when used. Letters from the patient should be baked or written on postcards dipped in carbolic; they are capable of spreading disease otherwise.—From an old Scrap Book.

Best Gifts for Children.

Talking of suitable gifts Naomi Wolcot, in "American Agriculturist," says the best and one that will give pleasure the longest is that out of which a child can evolve hours of profit and pleasure. A toy soon loses its charm. A set of tools for a boy will give pleasure for years and develop the mechanical skill latent in most boys. A workbox with everything for sewing, a lot of gay embroidery silk with patterns, a good paper or magazine that comes with its broad information and good cheer, a set of drawing pencils with studies, a photo camera, and many other things to instruct the eye, the hand, and the mind, will give the greatest value for the money expended, will make children more contented at home, and get them in a habit of investing instead of wasting their time.

Eating Between Meals.

However slight the meal may be, it should be fixed as to time and quantity, these being determined by the hours of the family meals and by the amount the child then eats. The kind of food should also be as carefully looked to as at other meals. Promiscuous and irregular eating should not be allowed. Children often ask for food apparently to fill the gaps between games, or when no better amusement than eating presents itself. And the child's demands are often supplied with no greater intelligence—biscuits, fragments of cake, or "whatever comes handy" in the pantry are given to it.

So far as one can judge, it is more frequently these irregularities than the food taken at meal times that cause the frequent indigestion of childhood. When a child is old enough to have his meals with the adults, the "between meals" should be very light; a little milk, a biscuit, or a slice of bread and butter is usually enough. Of course, different diet is required for different ages.

Keeping Ants Away.

To keep ants away, sprinkle the shelves with powdered borax, or steep a sponge in molasses and water, then lay it on a plate where the ants run. They will fill the sponge, when it should be scalded; repeat until they are exterminated. This is a slow but sure remedy.

The Benefit of Apple Eating.

Apple eating is very beneficial to health. Apples are very nutritious, for they contain more phosphoric acid than any other fruit or vegetable. If eaten before retiring the brain and liver are benefited; undisturbed sleep is promoted; the odour of the mouth is disinfected; the superflous acids of the stomach are restrained; hemorrhoidal disturbances are paralysed; secretion of the kidneys is accelerated, and the formation of stone is prevented.

The Fruits to Eat.

Prunes afford the highest nerve or brain food, supply heat and waste, but are not muscle feeding. They should be avoided by those who suffer from the liver.

Oranges are refreshing and feeding, but are not good if the liver is out of order.

Green figs are excellent food. Dried figs contain nerve and muscle food, heat, and waste, but are bad for the liver.

The great majority of small fresh seed fruits are laxative.

All stone fruits are considered to be injurious for those who suffer from the liver, and should be used cautiously.

Lemons and tomatoes should not be used daily in cold weather; they have a thinning and cooling effect.

Warts.

Warts on the face, comb, ear-lobes, and wattles can be cured by the application of crude phenyle, but as this disease, commonly known as chicken pox, so often occurs too close to the eyes to allow of the application of such a severe remedy. Holloway's ointment, if well smeared over each nodule, and then rub in powdered sulphur, one application will generally suffice to kill the fungus or parasite which causes the complaint; the scabs drop off in about a week's time after being treated.

Relief for Tired Eyes.

When the eyes ache, relieve them by closing the lids for five or ten minutes. When stinging and red through crying they should be bathed in rose-water, or wet a handkerchief with rose-water and lay it over them for a few minutes. If they are bloodshot, you need more sleep, or have been sitting in a draught. If they have a burning sensation, bathe them with hot water to which a dash of witch hazel has been added. If the whites of the eyes are yellow and the pupils dull, strict attention should be paid to diet.

Women as Gardeners.

There is one thing very certain in relation to women in connection with the vocation of gardening. It is, says a writer in the Gardener's Chronicle, that they bring to its study far more earnestness, steadiness, attention, and study than the superior males do. If men-students were but endowed with woman's living earnestness it would be much better for them. I saw pretty well he writes, when giving lectures weekly to some twenty-five young women and from fifteen to sixteen young men at the same time that while the males took no notes and gave little attention, the females gave the closest attention and took notes freely, also at the close asking questions.

Baby's Bed.

Give the baby and each child a bed to himself. Two single beds take but little, if any, more room than a large bed. Have the sleeping room furnished with only such furniture as it necessary.

See that the clothing of the little sleeper is lose at the neck, waist, and arms, and keep the head uncovered. If there is anything children cannot do without it is fresh air.

Through the pores of the skin the body is continually throwing off poisonous vapours.

No extract of poppies can compare in sleep-inducing power with Old Sol himself. Therefore, it is easily understood that poor sleepers should pass as many hours as possible in the sunshine. Many women are martyrs and do not know it. They shut the sunshine out of their houses, wear veils, and carry sunshades, they do all that is possible to keep off the subtlest and yet most potent influence which is intended to give strength and beauty and cheerfulness.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. nd MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive orrespondence and answer questions. hese replies will, for the most part, be ent by mail, unless received just prior o date of publication.

PUBLISHING DATE.—On the 25th of ach month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this ournal until we are notified by letter to iscontinue, when all arrears must be aid.

SUBSCRIPTION.—Posted to any part f Australasia 5/- per year, in advance. oreign, 6/.

ADDRESS—85, Currie St., Adelaide. elephone, 1234.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not ater than the 15th of the month.

Open Border Notes for October.

Put out all summer annuals.

Get on with the planting of lawns a green sward is desired in January. Sow or plant Couch; but for uffalo, plants put in 3 or 4 inches part are best. Dress old lawns with ne sandy loam; with a sprinkling of uano, or artificial manure to force he grass.

Tie up Carnations, and mulch with mp manure. Disbud for large looms, and keep covered as they pen. Plants in pots or rooted cuttings may be put out; but striking uttings should be discontinued.

Bed out hardy Begonias. Any good ed of spring annuals ought to e saved and put by for next season. his also applies to Anemones and anunculi.

October is the time for mulching, anure should be fairly well rooted, ut not too fine.

Roses should have a good mulch of ow-manure, and applications of quid manure once a week to ensure good display.

If large perfect blooms are required shading must be put over each loom, this can be done with a small ox covered with scrim or darkened lass. To get large blooms all but e centre bud must be cut off.

Any bulbs which have yellowed their aves can be taken up and stored. e refer to Narcissus, Anemones, ias, Freesias, Hyacinths, Gladiolus, anunculus, Snowflakes, etc.

Any seedling petunias ready may be anted out.

Cut Rhamnus, privet, pittosporum, d coprosma hedges.

It is not too late to divine nnas.

All Chrysanths for large blooms ould be in their flowering quarters. t for the garden or pots keep growing on for some time. Cuttings can be struck for later potting. Those in beds would be improved by mulching.

Sweet pea's need some attention in the way of thinning, training, mulching, watering, and later, shading, if quality is desired.

Shrubs etc can still be planted out of pots. Seeds of biennials and perennials can be sown for the next season's flowering.

If desired a bed of single or double Violets may be put out. These will make strong stuff and flower earlier than plants put out in autumn.

Polyanthus and primroses can be treated the same way, but they must have a shady position if fine flowers are wanted. Use good firm loam enriched with rotten-cow-manure for all the above.

Gladiolus.

Now is a good time to look up surplus bulbs for overhauling, and see that they hold no trace of mealy bug, a white, fluffy insect which seems very partial to both gladiolus and watsonias. You will generally find this pest settling in between the remains of the old bulb and the new one. Break off all the dried, old stuff, and take a look for the bugs. If there is any trace of the pest drop the bulbs for a few minutes into a fairly strong solution of soda. One pound of washing soda to four quarts of water will do. The insect usually infests the stock that is kept too long out of the ground.

When taking away the old bulbs you also remove the small corms which hang round. These you can plant a few at a time between the big bulbs. They increase in size rapidly, and make flowerers the second season. By no means waste the little ones. They always come true, and are not difficult to handle.

A light, rich, friable loam is the best medium in which to grow these plants. Be free with the manure, and add a good sprinkling of bonedust to stiffen and lengthen the growths. Gladiolus stand a lot of feeding. They give good returns for all you give them. Our plan is to plant about fifty together in a row. When looked after the blooms are beautiful. One or two stragglers are of no use to anyone. You can always get a more brilliant display from the good varieties than you can get from any of the flowering bulbs. And, what is better, the returns are had at a very little cost. If you cannot plant in rows, place eight or ten bulbs in a circle, and leave the centre open for carrying a stake to support the spikes. From three to four inches below the ground is deep enough for planting. Light soils permit one to place the bulbs a little deeper.

When buying bulbs get the best you can afford. Good quality stock is always worth what it costs. One loses time and money fiddling with what is cheap and nasty. Don't be afraid to use a mass of any brilliant variety. Whenever you can get a pocket of rich so,l in a sunny position is the spot for "glads."

Lift the bulbs as soon as the foliage begins to yellow. Cure them for a while in a dry place, and then prepare for the planting. Two crops of flowers may be taken in one year.

Where the ground is only of moderate quality it should be enriched with old cow manure, sand, and, if possible, leaf mould. Dig this trio well down, and allow the bed to settle again for planting the bulbs. In heavy soils let the plantings be somewhat shallower than is done in sandy stuff.—Exchange.

Table Decorations

— An Article full of Interest and help to the Women and Men who use their Flowers for Decorating the Home. —

From The Amateur Gardener.

To be a successful decorator the man must love his work. I know that many of my craftsmen look upon this branch of their profession with anything but pleasure, perhaps because of the large amount of flowers required, plants that are ruined, the extra work it entails, or they are of that school who think the proper place for flowers is the garden only. But they are outvoted everywhere. The increasing demand for house adornment with plants and flowers (some of you may say the craze) is growing every year. The idea that plants and flowers in living rooms make the atmosphere impure has been exploded long ago, in fact, it is now recognized that plants tend to make the air purer. A few ornamental foliage plants properly placed with vases of flowers dotted about, adds much to beautifying the home, and when you see the same home unadorned, it does not matter how choice and well furnished it may be, the rooms look cold and have a desolate appearance. Let the gardener cut and arrange the flowers himself, and look after the welfare of the plants while they are in the house, and the complaints about scarcity of flowers and the disfigurement of plants through the inexperienced cutting and hacking them about will cease, while the plants in the house will not suffer near so much as they did when he left them to the tender mercies of the housemaid.

A mistake is often made at the commencement. "A new broom sweeps clean," and a new gardener always like to make a good impression at first, and commits himself to many things he would gladly be relieved of later on. He should first look carefully round and judge what his work must be by the material at his disposal, always allowing for something up his sleeve for highdays and festive occasions; for, however, he makes the drawing room, boudoir, or staircase, he must make them smarter still for special events, and if he uses his best material for ordinary days, he will find it a difficult matter to keep up the good impression he may have given when he was a "new broom."

The first arrangement of plants in the house may not please those who have the right to enjoy them, but a short interview at the outset, pointing out that delicate plants can be used to advantage with very little damage to them if they are allowed sheltered nooks away from the cold morning draughts when the housemaids are ventilating, and that plants with stronger constitutions will stand a reasonable time in the exposed positions, will soon put that right —that is, if the gardener has the gift of being a good listener, not too much of an adviser, and whose bearing is that of one wishing to please. Then he must devise some system by which he intends to work, and whatever his arrangements are he must stick to them. The servants in the house have their systems, and they will gradually learn to fit their work in with yours. The best time to arrange, change, clean or water the plants or arrange flowers in vases, is early in the morning before the family are astir. Let your work be in evidence only. If the day is going to be a festive one, and a large number of plants and flowers are required, the work should be done by the same hour. If you should unavoidably make any litter, the maids have then a chance, before the family make their appearance, but their work may be pressing too, and there will be no complaint about the mess the gardener made. This can be done by making all arrangements the day before, knowing exactly where each plant has to go. Everything going into the house, the drawing room and boudoir especially, should be scrupulously clean, both pot and foliage, also the gardener as far as possible. The soil in the uots should bot be seen, in most cases receptacles are used to put the pots in, but where the jardiniere or vase is too small to hide the soil, moss or even small shells may be used to advantage. When you select a plant for any given position, it should be in keeping as far as possible with its surroundings. An aspidistra would look well in one position, place it behind some light piece of furniture or near some light drapings, and it would not hold a candle to say, cocas, weddleyana, eulalia japonica, and zebrina, some light dracaena or croton; while these would not fulfil the purpose that an aspidistra would, where the surroundings are heavy and sombre, such as you generally find in the hall, library or staircase. The only hard and fast rule should be

that where house decoration is required the best plants possible should be used, not leggy worn-out plants that the gardener may put on one side to be used up in the house. If the work is properly managed a collection of plants can be used with very little damage. Some plants are so delicate that one day and night is quite long enough, especially where gas is used, others require changing biweekly, the majority weekly, while others will stand for months if kept regularly sponged. Newly-potted stuff suffers the quickest. Along with the permanent plants of which palms form the largest number, grow annually batches of dracaenas, crotons, aralias and others of that class of stuff, not forgetting the commoner kinds of plants that a bush-house can supply, which in their places often beat the above, such as eulalia, cyperus, begonias, plenty of adeiantum, pteris, nephrolepis, not forgetting asparagus, all in their different kinds afford splendid material, not to mention, coleus and other hardy plants which, if grown quick, will help wonderfully in relieving better or more permanent and valuable plants. The whole subject hangs on the first item of this paper, whether a man really loves his work; if he does, all things will run smooth.

Table decoration is a branch of the gardener's work which calls for more careful attention than all the other decorative work put together. To have a supply of suitable material for every day of the year is no easy matter, especially if his employers entertain a good deal in the way of luncheon and dinner parties. These functions exhaust a lot of material, fern, asparagus, simlax and grass especially. Flowers are the least item. If a few stocks beds of suitable flowers are kept going, handy to water and manure, it is surprising what a quantity and succession of bloom can be had from a small piece of ground without drawing from the beds and borders in the pleasure ground. Say a piece of ground 30 feet by 30, cut into 12 beds 4 feet by 14, put 24 of hunnemannia into the first bed, and anyone who has tried it will bear me out when I say that the quantity of flowers that can be cut from two dozen plants for 6 or 8 months is enormous; and then you fill the other beds with bouvardia, rhodanthe, carnations, violets, larkspur, coriopsis, gypsophylla, narcissus, jonquilla, anemone and ranunculus, also eragrostis, tricolina, penisetum and other grasses. There are times in the year when you would feel proud and thankful for that piece of ground, especially if you could work in somehow a succession of sweet peas, which in their season will take some beating in this particular work.

The breakfast table requires no set arrangements of flowers, a bowl here and there, say of roses, violets, mignonette, wallflowers, or a few water-lillies in finger bowls are all that is required; only let them be fresh.

A lunch table should be pretty and dainty, the decorator can take advantage of many shades and tints that would be dull and cheerless under artificial light, such as mauves, most of the blues and some of the yellows; simple arrangements are the best. Use more plants on the table for this meal than for any other, they save flowers, give change, and always look well if properly placed. No larger pot than a 6in. should be used, but don't overlook a well furnished plant that can be had in a five. Never let the pots be seen. If you have no vases or receptacles of any kind to put the pot in—and it is perhaps just as well if you have not, for the general run of these things are far too heavy and stiff looking to be on the table—place the plant, pot and all, in a soup plate or saucer, mound up to the pot with wet sand, cover the sand with moss or selaginella, place a few flowers with fern or grass through the moss into the wet sand, and if you follow this out, according to the size of the table, with smaller plants and smaller mounds, a very pretty and cool arrangement of plants can be obtained without a vase or specimen glass on the table.

A tea table at garden parties or similar entertainments where refreshments are not handed round, but spread out on long tables in marquees or on verandahs, should be bright and cheerful. Take your cue from the gay dresses, hats and parasols you generally see on the lawns at such functions, and you will have all you can do here in Australia to vie with them.

A dinner table should either be rich and beautiful or light and graceful. If the former, care must taken, that it is not the heavy or "table of flowers style" which often prevails. No decorator should by his work force the host or hostess to crane their necks to get a glimpse of half their guests on the other side of a hedge of flowers and foliabe. Yet this is done, and by professionals, too, who seem to aim at giving good value in material, rather than their art, even going so far as to place bows of ribbon on floral arrangements on the dinner table. Centre pieces or epergns when used should be arranged with suitable material that will enable you to see through or under it, and in this matter a good deal depends on the style of the receptacles. Too much care cannot be used in selecting your colours. The most pleasing dinner table is that on which one colour or shade predominates. I once saw a dinner table beautifully arranged with lilly of the valley and niphitos roses. I felt I would have liked to supplant every niphitos with Reine Maries, or the lilly of the valley with heuchera sanguinea. Something was wanting. Even a dozen blooms of anthurium Schererianum would have helped it, or a few sprays of euphorbia jacquiniaflora, of which which there was plenty on the premises. Yet the guests sat down at that beautiful but cheerless table. A scarlet table always looks well if you use the one shade

(Continued on page 198).

Fuchsias.

Fuchsias are the most handsome flowering plants we have, if properly treated, though unfortunately they have been very much neglected of late years. Some years ago they were thought a great deal of. How is it that it is not so now? I think it is because people have taken to other varieties of flowers, which, in many cases, are very inferior to the fuchsia. All they do with them is to put them out in the garden and let them do as they like, as best they can, without water or attention. The fuchsia is far easier grown than many other varieties that are grown to-day. But they must, like many other flowers, have special attention to be grown well. By giving them that attention they will amply repay you both in quality and appearance. They like shade and moisture, and without they will not give the satisfaction you expect from them. But do not grow too many; grow a few, and grow them well. There are some kinds that are not easily grown to good specimens, because their habit is to grow rather loose. You will have to look after them carefully, or get kinds that are of more compact habits; also remember mix your colors so that they blend well together. Now the question is what is the treatment they require? First of all, you strike your cuttings in some light peat and white sand as quickly as possible, so as to keep them soft; keep them growing; do not let them get hard and stunted, if you do you will have little or no satisfaction. While your cuttings are striking get your pots and soil ready, so that you can pot off as soon as they are ready.

The soil should be made up thus:—One part of cow manure, one part of leaf mould, one part of peat, not broken too fine, and one part loam. Mix well together, let it lie for a while, then clean your pots thoroughly. Let them be well-dried before using. When potting, do not pot too hard, as they like moderately loose soil, so that the roots will be able to penetrate better. You must keep them under glass or canvas. The former is best, as you have them better under command. To be successful with them you must keep them moderately shaded from the hot winds and sun, and they will require to be turned round twice or three times a week, so as to get them to grow all round alike.

— Showing. —

They will have to be pinched off as their shoots grow. Do this to within about ten weeks before the show. You must keep shifting them on from one size pot to another, until you get them to what size you want. Also keep them moist with a syringe. This will greatly help to keep down the thrip, as well as keep them growing and clean. After this they will begin to bud for flower, and make splendid specimens for show. I think that you will find that 10in. pots will be quite large enough to handle. You must feed them twice or three times a week with good cow manure or some other manure. The best way is to put the manure is a bag, and put the bag with the manure in a tank or cask. When using it add some water as it may be too strong. It is better to use it weak than too strong. Remember to put a stake to the plant as soon as possible to keep them from breaking off, which would, of course, spoil the plant, and you labor would be lost.

We have grown them in one year from 2 to 4 ft. high, and in a few years to 5 and 6 ft. high, so thick and bushy that you could scarcely see through them, and so well grown that one side was as good as the other.

— After the Show. —

Put the fuchsias outside to harden off till time to start them again. Then take them in again under glass or canvas and begin to syringe; clean off all dead leaves and wood, and keep them clean. When started again reduce the ball as much as you reasonably can, and put them back in as small pots as possible. Treat them as before, and you will have fine specimens year after year.

About Asters.

With the first breath of summer the knowing flower-grower turns up his favourite seed catalogues, and makes straight for the aster list. He intends to be in early, so as to get a show while asters are at their best. And by ordering his fancies, and by sowing them he "gets there." You never find him late. His plants are clean, nicely grown, and in full bud by the middle of January when someone else's aster patch is only in its infancy, or struggling against unfavourable conditions, mostly brought about through ignorance and neglect.

Asters are as easily grown as weeds. Anyone who will give the seedlings half a chance can get moderately good blossoms; those who are willing to try, and understand the ways of the asters, will do very much better, and reap a lot of pleasure for their labour.

All the same, there are just a few things to know, some of which assist one materially.

As with almost everything else the beginning of all good flower work lies in having the right soil conditions. Give asters a bit of nice, sweet, loose loam that has not had an overdose of manure, and they get something to their liking. Be particular about the friability of the soil. Lumpy land, well filled with new manure, is of no use to this family of flowering plants. You must let them have good soil conditions to start with. A very sandy soil is not the ideal, as it gets too hot during the summer months, and requires more mulching than the plants can stand. A piece of land that has been well manured for a previous crop is the right sort of thing for this popular annnual.

Manuring for asters is usually done on too liberal a scale. Many of us have been trying to grow our flowers as we raise lettuce or beans, in a bed that contains a lot too much forcing food. That sort of thing is quite wrong. We must shorten the manure supplies some, and use more leaf-mould and light material. Altogether too much nitrogenous manure has been used of late years. The "green flower" trouble, which for the past few seasons has spoiled quite a lot of shows, can be attributed to an over-supply of water and nitrogen. Time after time we have been at our wits' end to account for this failure, and could not hit on the right idea. Only a night or two since, in reading through Professor Osterhout's "Experiments with Plants," we came across this explanation. The professor says :—"It is a well-known fact that manuring with nitrogen, combined with abundant watering, very commonly produce 'green flowers,' i.e., flowers in which petals, stamens, and ovules are transferred into green leaf-like bodies. This happens frequently in garden asters and other compositaes. So use less stable manure, and try a light sprinkling of the chemical mixture which is used for stone fruits and flowers." Get the seedlings started in a well-tilled bed, and rely more on chipping the surface and watering than on any forcing materials. When the plants are well-grown, and are showing bud, then you can mulch with stable litter and begin to force the pace. Get the flower habit fixed ; after that the extra feeding will do no injury.

Sow the seed as early as you can. Just follow the ordinary methods, and be sure that the soil cover is only a very light one. Watch the seedlings carefully until they begin to lengthen ; then let them get plenty of water. The warmer the weather the better for the young asters, provided you water them. And don't be afraid to transplant the seedlings in the hottest weather. A shading for the first few days after shifting will usually put the youngsters on their feet again. Be ordinarily careful, and matters will go nicely. Asters are no trouble to the worker. Place the seedling 12 inches apart. Arrange tnem in beds or rows to suit your own liking. Remember that asters make a bunchy root, and do not go very deep. Let every young plant get a handful of light soil in which to make its start.

Erica or Heath.

Ericas, or heaths, most of which are natives of South Africa, a place having a climate very much like our own, have usually been considered unsuited for cultivation on the Adelaide plains. But this of late years has been proved a fallacy, for treated in a proper manner, they will do as well, if not better, than many things considered much more hardy. First and foremost they must have a bed or border specially prepared for their reception. This is done in the following manner. Take out the whole of the original soil to a depth of two feet or eighteen inches. Fill in the bottom of the trench, four or five inches deep with broken potsherd, scraps of slate, or stone, pieces of charcoal, and similar rubbish ; this is for drainage. Next mix with the best soil taken out an equal proportion of sandy peat, and fill in the trench with it till the soil is an inch higher than the path. Before planting give a thorough watering. Planting—Turn the plants out of the pots, disturbing the roots as little as possible and removing the crock and drainage before planting in the bed. Give each a good soaking, as it is transplanted, and immediately mulch with either very old stable manure or with pure seedweed. In the cultivation of the erica or heath, three things must be remembered before success can be attained—1. Never allow the roots to suffer from the slighest scarcity of water. 2. Don't mix manure with the soil of the bed in which they are growing. 3. Disturb the soil between the plants as little as possible ; in fact, all the cultivation they require can be done with the rake. If these directions are followed, I am sure that those who have failed with this plant will have cause to be well satisfied with the result. They are propagated by means of cuttings taken from the points of the shoots. Fill a five-inch pot half full of drainage, on which place a layer of sandy peat to within three-quarters of an inch of the rim of the pot, and then a half inch of pure silver sand. Insert the cuttings round the edges of the pot, give a good watering, and cover with glass until struck, when they may be potted off singly, using a sandy, peaty soil, and taking care that each pot is properly drained.

(Continued from page 195).

throughout, but if you mix with reds and rose pinks the one kills the others. Blues can be effectively used with most pinks, yellow must always stand by itself. Hunnemannia looks fine by itself. Mix, say, Cosmos Klondyke with it and you spoil the effect. In fact it becomes vulgar. There are exceptions in yellows, but always let the lighter shade off from the deeper, as the canary yellow of the hunnemannia would from a ground work of old gold. The soft pink tints of sweet peas make a lovely table, so do the deeper rose tints and some reds, with white, but if you go to your row of sweet peas and cut indiscriminately regardless of colour, there will be no harmony, and in what might have been a refined and elevating table you only get a display of colour.

The same might be said of roses and chrysanths. What a lovely table one of the ramblers make by themselves; mix them altogether and what a conglomeration. Some of you are saying, "we know that"; but I have no hesitation in repeating, that when roses are used, nine cases out of ten the mixing system is in evidence. I once had an opportunity of seeing 56 tables arranged in the basement of the Sydney Town Hall, each by different persons, with each person trying to outdo the others. A few were real good, but when I walked round those tables after they were all finished, my feelings got mixed up, just like the flowers and colours. Roses were there galore, all mixed colours, specimen blooms jammed in with decorative ones. Sweet peas came next, all mixed colours. On many of the tables the elaborate receptacles for the flowers were more in evidence than the flowers—bridges of flowers, elaborate wire works with gold painted funnels for holding water, arranged painfully light so that you could see the wire works. This display was no exception, for wherever you go, you see very little good table work. The displays we see at the flower shows in Sydney and suburbs are not a good guide for practical work. If the decorator had just a white cloth on a table, and the whole of that cloth was at his disposal on condition that he left just enough room for a knife and fork, then he could sometimes take a pattern in a show room, but in a well appointed dining room he has candelabra to contend with, pieces of silver, more or less according to the wealth of the owner, dishes of fruit, smaller dishes of preserved fruits or nuts, and many little things that all go to make a dinner table complete. These with the flowers are all part of the decoration. The examples we see at the shows are not practical decoration at all, but simply tables of flowers.

Why the schedules should specify "flowers and their receptacles only," I cannot tell. The best arranged dinner table to seat a given number of persons, without any specification at all would be far better, and would be educational to those visiting the shows. Why should dishes of fruit be omitted in the show room, or the glass and cutlery not be set in a correct manner. You see it in the show rooms in other States and in the Old Country; why not here? With a judge worthy of the name, it would not be the value of the appointments that would tell. The gardener could compete with the wealthy amateur by hiring at a very small sum all he required. Where daily table decorations are required, change of style is necessary. Take a bad season when we have to rely so much on the Chrysanthemum. We may be obliged to use her on three successive days, Robert Williams with Madam Carnot for one, Mavana or A. J. Balfour for another, with Edward Andre or Edwin Molyneaux for a third. The first would look pretty with the grass of tricolina rosea over a mirror, draped with old gold silk, with yellow shades for the candellabra or candles; the second with pink camellias loosely arranged among sprays of asparagus trailing about the cloth, with pink shades; while the third would make a good relief over a ground work of the yellow and bronze tints of autumn foliage and berries. I don't like to see a mirror on a table. Nothing beats a white damask cloth, but change is sometimes necessary and the mirror supplies that change. Glass is an important item in this work. A set of glass just suited for the material you are using goes a long way towards successful work; the vases should be as simple as possible and of plain workmanship. There is no need for beautifully figured designs on your glass. Coloured glass is bad, for it often clashes with what you want to put into it. A plain clear glass, or a smoky dull white is far the best for the flowers are to be the ornaments of the vases, not the vase of the flowers. The best centre piece I have seen is a shallow glass dish or bowl, out of the centre of which rises a long slender glass stem expanding at the top into a cornucopiga or trumpet like vase. This, when lightly arranged and not made like a huge bouquet, looks well, stands well up above the line of sight of those sitting at the table, while the bottom bowl can be arranged low enough to be seen over, or light enough to be seen through. With two smaller stands of this description for half centres, and six on eight smaller stands on flat bottoms with smaller trumpets make splendid vases. All that is then required to make the best set of glass possible for most purposes to seat 24 persons is a set of 24 specimen glasses. This set is suitable for almost any kind of flowers that can be used for table decoration. Change is mostly wanted in the specimen glasses, a good selection of these is a great help. The kind most useful is a tube-like glass about 3 inches long, set on broad bottoms so that there is little danger of them been toppled over, a fault with many of the sets on the market is that they topple over too easily. If you are compelled to use glass like that, a little shot in the bottom is a good plan. The next best kind to have if you are narrowed down to two sets are small

lobe like glasses suitable for owers with short stalks like zalia, camellia, ivy-leaved gernium, berries and autumn foliage. s a ground work to an autumn oliage tables, heads of highly oloured amaranthus or bits of roton are well adapted for this lobe like glass. There are many ther kinds in pretty shapes that ould be very helpful. Specimen lasses pure and simple are suitable or one bloom only, say of the ose, Jules Grolez or Belle Siereight under an arrangement of he lighter Maman Crochet or omtesse Labarthe. Nothing beats few finger bowls when such owers as water lilies are to be sed.

The mode of going to work on a able should be studied so as to educe the time actually spent in he dining room to a minimum. First decide what your table is to e like before you cut a flower; is a bad practice to cut a lot f stuff before you fix in your aind what the design is to be. good decorator is arranging his able while out cutting the maerial—long stems of this and hort stems of that; just the proer quantity of this or that—and y the time he has dressed his owers, fern foliage or grass, the able to him is practically finished, t any rate the largest amount of ork is done, and this should be one outside the dining room. Never use wire when you can posibly help it. Wire is indispensable or personal adornment or funeral ork, but out of place on the able, and flowers had better be iscarded altogether if they canot be used without it. If it be a inner you have to decorate for ut your flowers before the sun ets powerful, and get to work on he table as soon as it is vacant fter lunch, you then get the best ight, and the quicker you finish he sooner the butler or waiters an get at their work. First arange the stands and vases with if gas is not used) the candelabra, andlesticks, pieces of silver such as cups, chalices, fruit baskets or ruit dishes. See that the whole alance, and fill you receptacles with water, allowing sufficient oom for the stems of flowers and oliage. Then arrange the foliage, whether it be fern, foliage or rass. More care should be taken n this than any other part of the work, for if it is well done, the lowers will almost find their own laces when the table is properly lothed. It is surprising how very ew flowers are sufficient. Let the lowers act as the lace, bows, and pretty bits of ribbon do to a well dressed girl. The mistake of using too many flowers is often made, just as the pretty girl often overdoes it. When the flowers are arranged place a specimen glass wherever one is needed, the number required will depend on the material you have already used. With some flowers and a table to seat 24 persons I have used 24 specimen glasses in addition to the centre piece, two half centres, and 8 vases; with other foliage and flowers 12 would be ample. These, if not wanted for specimen blooms, should be arranged light and dainty, with tit-bits of the best material at your disposal, for these stand up individually under the noses of the guests, while the other pieces should blend one into the other to make one whole effect. If the flowers were properly dressed before they saw the dining room, there will be very little cleaning up. A good plain is have a tray say, 4ft. by 2ft. 6in., with sides 4in. deep; this can be pushed or pulled on a light stand round the table as you work, and acts all the time as a work bench. Any bits of stem or surplus foliage then have a resting place, and do not find their way on to the edge of the table, carpet, or worse than all, into your pockets; for pocketing anything in the dining room, even if it be only bits of stem and foliage, looks bad.

These remarks apply mostly to the work required of gardeners in private establishments, or as we used to say in England, in gentleman's service. Decorations at public functions in public halls, hotels, and restaurants, scarcely come within the scope of house decoration, and has food for a paper in itself, while my remarks on table decoration applies equally to public and private functions.

The Popular Delphinium.

Delphiniums should only be planted in the deepest and richest soils. Ground that is impoverished is of no use to this class of plant. Good cultivation and transplanting into a new situation at the end of each resting season is the way to get the high-quality blooms. The annual transplanting and division tend to stimulate the root growth, upon which the future foliage and flower spikes so much depend. The method of procedure is to lift the clumps in spring, as soon as the new shoots begin to push through the earth. Use a sharp, strong pruning knife to cut away a section of the old root stock, with a nice clump of roots attached. Pot these up for a few weeks in four or five inch pots, using a nice, friable loam. Place the pots in a bush-house or frame for a week, and see that they are well attended to. Let the waterings be no more than sufficient to keep the soil nicely moist.

As soon as the growths are a few inches high, plant the new stock out in the best position you have. Shade may be necessary for the first few days. See that none of the old rotted or hollow pieces are taken with the new clump. All diseased parts should be cut clean away. The new bed should be prepared some months ahead of the planting time, and will do with a plenteous liming.

Seedling plants that are being held over through the winter must be protected from the slugs and snails at the time they are showing their first shoots, and be planted out in the way alluded to above. If you are only growing good sorts, allow no duffers to flower in their company, or you spoil your chance of getting seed good for sowing next season. But it is not a good plan to grow for seed. Remove the first spikes as soon as they fade, and mulch with some old manure to feed the next crop.

Thinning of Blooms and Pollination.

As pears and apples come into bloom it will be easy to discern how far each variety or tree has been thinned and generally shaped, according to its needs. The spring is full of interest for the fruit grower, and though he may not find time nor is there any need that he should—to pry into subtleties of plant growth, he will find it greatly to his advantage to watch the unfolding of leaves and flowers with the object of noting their value as they appear in open or close confined parts of the tree. The sex and vitality of flower buds is largely determined by the leaves which gave birth to them, and which disappeared during the autumn or winter months, but even when a bud has been well formed and endowed with all the requisite qualities to yield fruit, it may still fail through receiving defective treatment in the spring. Apart from bad weather, space or the want of it, and insufficient sun heat, light and air, may prevent the elaboration of the pollen grains, in which case it is impossible for flowers to yield to fruit. An examination of the different parts of trees will show some flowering or setting most freely on the windy or well lighted side, whilst in the event of very boisterous and harsh weather prevailing the best results may be on the protected side. Again, trees bear throughout, or only in part, of their in or exterior, in which case the lesson should be easily learned. With many who have grown old in the orchard, bearing is supposed to be possible only on the outside of trees, but this shows want of insight and woeful lack of capacity for the business of fruit growing. Now, whilst the buds are unfolding, do some thinning of crowded spars and their blooms. See also to the tops of trees that they may have abundant light, and not be able to make double growth at the extremities. In a few weeks' time it will be plain enough what degrees of openness proved most conductive to setting and the even distribution of fruit. Naturally the most vigorous trees will bear with the most open branch and spur arrangement, and it will probably be an advantage to thin the new wood as well as the old—that is, when shoots have grown to four or six inches in length, as then they snap off easily and save a lot of winter pruning.

Burn nothing but dangerous rubbish. All litter which is not infected by any insect, pest, or disease, should be collected and placed where trees stand in need of mulching. Old hay and straw stacks, if they can be soaked with water, will decay sufficiently to make splendid orchard mulch. Sometimes a ditch or dam can be filled with dry straw or other litter, and so converted into a soil dressing. The man who keeps his eyes open to see whatever exists in the form of humus and a soil dressing, and regularly applies it to his trees, is bound to receive a good return for his labor. —Exchange.

Bagot, Shakes and Lewis, Ltd., Stock and Station Agents, Wool Brokers, Live Stock Salesman, and Licensed Land Brokers, hold periodical sales in any part of the State. During recent years some of the largest Estates in South Australia have been disposed of by them for closer settlement, with very satisfactory results to all concerned. Advice is given by the firm as to the best means of realisation, plans are prepared according to instructions, and valuation made in any part of the State. The real property department inaugurated for the firm by Col. A. C. Catt a few years ago has had a very busy time ever since its inception. An efficient staff deals with City and Suburban properties, for which, owing to the very large number of retiring farmers who desire to settle down in the vicinity there has been a very keen, if not unprecedented demand. Sellers of house and land property in City, Suburbs, and Country will do well to supply Bagot Shakes and Lewis Ltd., with full particulars of same, as their large connection (over 20 Branches) furnish them with exceptional opportunities for effecting sales. On the other hand, knowing so well the requirements of farmers who desire to settle down near the City, they are, as a rule, able to suit such without difficulty. The average individual who has spent his life on the land usually requires a reasonable amount of breathing space, even when near the city, and Bagot, Shakes and Lewis have been very successful in placing their clients in possession of properties, which, whilst possessing all the advantages of town life, yet retains to a great degree the charms of the country. Such properties, it need hardly be said, are getting scarcer to procure with each succeeding year, many of them falling a prey to the requirements of the speculative builder. The attention of farmers who desire a change of locality, or wish to place their sons on a good farm in one of the sister States, is directed to the fact that the firm have splendid estates in New South Wales and Queensland for disposal. The directors are Messrs. Geo W. Bagot and John Lewis (wool managers—and this department is now an important feature)—Messrs. Geo. Dowling and Geo. Jeffery (inspector of Branches), Mr. James Willinson, with Mr. John Jacob as secretary. The head office for the State is at 18 King William Street, Adelaide

SURE SYMPTOM.

"So he took you out auto-riding the other evening?"

"Yes; what of it?"

"Do you think he is in love with you?"

"I think so. I know that every time I spoke to him the auto tried to climb a tree or jump a fence."

Kitchen Garden

Notes for October.

In most districts with the advent of October the danger of frost is over, and active work should be no longer delayed in preparing for summer vegetables. All live gardeners will already have crops coming on in favorable situations, and plants of melons, tomatoes, cucumbers, etc., in the hot beds ready for planting out during this month. In the early districts early tomatoes, melons, cucumbers, and marrows, will already have made good growth under the protection given them by means of shelters and glass coverings.

The amateur in early districts is reminded that now is the time to sow in the open seeds of cucumbers, sweet and water melons, trombones, marrows, pumpkins, tomatoes, capsicums, and egg plants, but is also reminded that, to ensure success, he must carefully prepare the land. It is far better to plant one quarter of the area, properly prepared, than to divide the work over a large plot only partially cultivated. Dig and manure the ground deeply, how deep depends to a certain extent on the character of the land. For example, a heavy land with a good subsoil requires, and will pay for, deeper and more thorough cultivation than a light sandy loam. But whatever the nature of the land, complete success in gardening can only come with complete cultivation.

No time should be lost in getting in a bed of French beans, and here again thorough cultivation is the first essential to success. Work the ground deeply, manure it thoroughly, plant it carefully, and keep the surface loose. Of course, water must be applied as required, but no amount of water will compensate for lack of effective cultivation.

Put in beds of salad plants, such as radishes, cress, red and silver beet, spring onions, and so forth. Make another sowing of spinach, and don't forget to try that most useful summer vegetable, the New Zealand spinach; it will keep one supplied all through the summer, if properly watered.

In the early districts it is now too late to plant a general crop of celery, cabbage, turnip, etc., but in the late districts full sowing and planting of these vegetables should not be neglected.

Very few people know the value of kohlrabi, or turnip-rooted cabbage. It is a most delicious vegetable, and, like asparagus and spinach, should be grown a hundred times oftener than it is. It should be treated in the same way as cabbage, being planted out in rows 18 inches apart, and a foot in the rows, and should be used like turnips when the bottoms are about as large as a cricket ball. In the late districts, the careful gardener is now commencing nearly every kind of crop, suiting each to its locality, or the locality to each. Cabbages, cauliflowers, celery, potatoes, peas, beans, carrots, parsnips, turnips, red and silver beet, kohlrabi, cucumbers, melons, tomatoes, capsicums, must all be put in as the weather permits, the coming month being soon enough for the more tender plants.

Keep the ground clean, the surface loose, and see that the bed is kept moist. When planting out treat the plants gently and plant them carefully, select cool, showery weather for this, or, if you have to plant at other times, water immediately the plants are transplanted, and, if necessary, shade them from the direct sun.

In early districts the asparagus will soon be coming on. If not already done, all weeds should be cleared off the beds, the surface of which should be kept free, so that the asparagus has no difficulty in making its way through the ground, and if a mulch of seaweed is available, so much the better.

She: "Can you manage a typewriter?" He: "No. I married one."

Fruit Garden

Notes for October.

— Soil Mulch. —

By the time these notes appear the Spring work in the fruit garden should be well on towards completion. The ground should all have been ploughed or dug, and the surface reduced to a fine tilth, in order to provide the soil mulch to conserve the moisture during summer. The importance of this mulch depends in a large degree on the climatic conditions and also on the nature of the soil. The effectiveness of the mulch depends largely upon its dryness and fineness. This sounds like contradiction, but is nevertheless true, that in order to keep the moisture in the ground you want to keep the surface perfectly dry. The reason being that a suitable thickness of fine dry dust conserves the moisture as fully as does a mulch of seaweed. The thickness of the mulch required to conserve the greatest amount of moisture depends to a large extent on the character of the soil, but the orchardist will be working on practical lines if he keeps the mulch between two and three inches deep, and I must again repeat that the drier and looser the mulch, the more effective it is.

The principle on which soil mulch acts is by breaking the lines of capillarity between the air and the moist soil; in other words, it interposes a foreign body between the atmosphere and the earth. If a board or a blanket or a layer of short grass or seaweed is laid upon the earth, the soil is found to be moist right to the surface, and the layer of fine, dry soil acts in precisely the same way. And it is therefore necessary to renew the layer as frequantly as it becomes set, as it will after every shower of rain.

This soil mulch has other advantages it keeps the under soil cool during the hot spells of summer, it also keeps it warm during any very cold weather. It has a beneficial effect also on the formation of available plant food, tillage, and proper conditions of moisture and temperature, being the essentials for promoting nitrification. It also assists in the decomposition of organic matter because it prevents the ground from baking or drying out, and is a necessary accompaniment of ploughing in green manure, whether it be a leguminous crop or merely the weeds which have grown in winter.

The soil mulch, to be effective, must be made before too much moisture has escaped from the soil, therefore, I would strongly urge the fruit grower to get his ground cultivated at once if he has not already done so, and then keep the surface loose all through the season. It must be remembered that the mulch can have comparatively little effect in keeping the ground moist if most of the moisture has been allowed to escape before the mulch is put on.

The cultivation of the surface to provide the soil mulch has the effect of keeping down weeds—a desirable thing in summer time, though in the winter the more weeds or other plants there are growing in the orchard the better.

I have previously said that the necessity for the soil mulch depends largely upon the climatic conditions, and I have also indicated that the drier the country the greater the necessity for the soil mulch. There are districts in Australia where comparatively little cultivation is required for apple and pear orchard work during some portions of the life of the tree. Speaking in general terms, I think it may be laid down as an absolute rule that every orchard should be cultivated as completely as possible during the first three years of its life, and perhaps it would be wise to say four years. Between the fourth or fifth and eighth or ninth years the apple grower's chief anxiety in a modern orchard is to get his trees to settle down fully into the fruit-bearing habit, and in districts with a heavy rainfall, such as occurs in many parts of Victoria, the Mount Lofty hills of South Australia, and the south-west of Western Australia, it is often desirable to check the free growth of the tree by neglecting the cultivation during the summer time. The complaint is very common in the districts named that the young apple and pear trees will run to wood, and will not set fruit. The more you cultivate and the more you prune in winter, the more do the trees grow, and after studying the question for a number of years and conducting experiments on an extensive scale, I am of opinion that it is sound policy in many districts to limit cultivation of apple and pear orchards to one ploughing and harrowing in spring time.

The reader will notice that in this advice with respect to restricting cultivation, I have limited myself to speaking of apples and pears because it is these fruits which it is usually difficult to bring into early bearing, and it is these fruits also which are particularly adapted for the country in which summer cultivation is not so necessary. In districts with anything under 27 inches of rain, systematic cultivation should never on any account be neglected.

— Grafting. —

It is not too late to crown bark graft old trees, and side grafts may be put in.

— Disbud. —

Watch all young trees, particularly those which have been grafted or budded, and rub off all buds or young shoots which are growing in places where not wanted, also remove suckers.

— Tie up Grafts. —

Tie up the shoots of grafted and budded trees when they are six or nine inches long to prevent their being blown off, and at the same eime tie them in such a way that they will grow in the d rection required to make good shaped trees.

— Plant Citrus. —

Oranges, lemons, and other citrus trees may still be planted with success, and it should be borne in mind that care in planting and in the previous preparation of the ground will often be equivalent to the saving of a year or two in the development of the tree. Good trees are worth care, and if it is worth planting a tree at all, it is worth

looking after it. It does seem unwise to pay for a young tree and then stick it in the ground, where the chances are that it will either die or fail to make good growth.

— Bud Oranges. —

Oranges may be budded or grafted now. The best method of re-working old trees with stems one inch and a-half upwards in thickness, is to use the crown bark graft about six inches from the surface of the soil, and heap up the soil over the graft, the same as is done for vines.

— Curl leaf. —

If curl leaf appear on the peach trees, take off the affected leaves and spray the tree thoroughly with either Bordeaux mixture or soda copper spray.

— Peach Aphis. —

Look out for peach aphis, and keep it in check by spraying with tobacco water, kerosine emulsion, or Burford's extract of soap, using four ounces of the extract to the gallon of water.

— Codlin Moth. —

Spray for codlin moth when the petals of apples and pears have just fallen.

ABSENT-MINDED.

Distressed mother: "John! John! Baby's swallowed my latch-key."

Absent-minded father: "Never mind dear—use mine."

A Scale Insect Destructive to Citrus Trees.

The Olive Scale is one of the principal pests affecting citrus trees. It causes much damage and is liable to attack almost any kind of plant. Orange and lemon trees are sometimes smothered with the wellknown Sooty Mould, a fungus caused by the sugary secretion from the scale insects which closes the pores of the leaves.

— Life History. —

The colour of the covering of the young scales is light brown, sometimes yellowish, and when fully matured is a dark brown or almost black. The number of eggs laid by each female varies from 200 to 250; they are of a light yellow colour, the young insects being of the same colour. When fully matured, the female occupies almost all the space under the covering, but when she begins to deposit her eggs she becomes smaller and smaller until she withers completely away.

— Parasites. —

Fortunately, this scale is liable to the attacks of small parasitic wasps and other insects which destroy a great number of the eggs. When in the caterpillar state, the Scale-Eating Moth (Thalpocharis coccophaga), is carnivorous, and destroys vast numbers of the scales. I have not seen the eggs of this useful moth, but Mr. Frogbatt says—"They are laid among the foliage and branchlets of the infested tree, from which the tiny caterpillars emerge."

When fully grown and about to pupate, the caterpillars form a covering over themselves, consisting of pieces of the partly destroyed scales. They remain in the pupal state for some weeks, then emerge, and commence their useful work. This moth attacks many other kind of scales, and is particularly abundant on the destructive Eucalyptus scale Eriococcus coriaceus, which is absolutely the worst scale infesting our timber trees, especially the Sugar Gums (Eucalyptus corynocalyx).

A small mite is often found in hundreds amongst partly destroyed eggs of this scale, but whether it is a parasite on the scale is not definitely settled.

The Frontal Shrike Tit (Falcunculus frontatus) is a great destroyer of this scale. I have often watched this fine bird busily engaged knocking off the coverings of the scale and devouring the young insects.

Red oil emulsion — 1 in 45 — has proved very effectual in destroying this and other scales. Several sprayings will probably be necessary. The formula for making red oil emulsion is as follows:—Boil 1 lb. of hard sliced up soap in a gallon of water till the soap is dissolved. Remove the vessel from the fire and add 2 gallons of oil to the boiling mixture. Agitate violently for a few minutes with a syringe, or replace the vessel on the fire and allow the mixture to boil again for five minutes.

Red oil wash covers bark and insects more thoroughly than crude petroleum wash at the same strength. Winter treatment has been found to be most effective against insects.

When the young scales are just hatched and are moving about the trees, kerosene emulsion will readily destroyed them, C. French, Jr., Vic. Journal of Agriculture.

Professor: "The average American girl is poorly educated."

Girl graduate: "You think so?"

Professor: "Yes, but there is one consolation: the average American boy will never find it out."

Ringing and Cincturing Non-Bearing Trees.

Trees fail to flower and fruit from various causes. One of the most common is excessive sap flow, which leads to what is commonly termed overgrowth. Extra growth not only means more wood than is wanted, but also a coarser and more robust or masculine type of wood than is indispensable to fruit bearing. It requires to be known that every time the volume and rate of speed of the sap is altered, its nature is liable to vary too. Thus we have crude or ripe sap, according to the rapidity with which it spreads itself over a given part of any tree. Trees in damp hollows, by irrigation channels, in sheltered and shady positions, or wherever capable of growing over the bulk of the warm season, are liable to form crude wood growth, and hence yield no fruit of a complete and useful kind. In such circumstances the first concern should be to steady the sap flow. This means putting a check on its ascent from the roots and at the same time allowing for a more complete drying and hardening of the young wood formed in the head. To this end ringing or cincturing may be employed. The difference between these two operations is that one consists of pressing and the other of cutting through the bark. Either method should be followed only in spring and early summer, and it is also necessary to limit the work solely to strong wooded trees, for where we see a tree of weak habit fail to bear flower or fruit we know that overgrowth or too much crude sap is not the cause of failure. Ringing is the safer method for trees which gum badly, such as almonds, apricots, peaches and cherries, but cincturing is more appropriate to apples, pears and plums. For ringing, a wide piece of galvanised hoop iron or a stout piece of zinc answers very well if drawn tightly round the trunk just below the branches, and there held in position by a strong headed nail, or by a coil of wire. If the trunk bark is at all coarse, the rough material should be scraped off, so that a good grip may be made of the more vital bark. Once a tree has been rung it requires frequent observation, so as to make sure that the head is not being unduly starved, and also to make sure that no suckers grow from the base of the trunk, or from the roots. The ringing material may stay on throughout the summer, but it should always to taken off in the autumn or winter, otherwise the bark beneath is liable to become sensitive, and a bad and cankerous wound form. Cincturing consists in making a circular cut or two right through the bark of the trunk, or any extra strong and unprofitable branches. If decidedly strong two or three incisions may be made an inch or two apart, and a piece of greased or waxed string should be laid in the cut, so as to keep it open, and at the same time exclude the air. The good or bad results of either ringing or cincturing may very quickly be noticed by anyone with a capacity for orchard work. Trees impotent from excessive growth require fewer or smaller leaves, and wherever the sap flow is restricted the leaves are bound to be of moderate size, and also ripen themselves and the buds at their bases. So, if in doubt about the value of this work, practise on a strong tree or two, and note carefully the results. To obtain the most prompt and convincing lesson, it is as well to ring or cincture certain branches of the head of the tree, leaving others untouched. It will then be quite easy to see how the character and the growth is altered, and a year or two at most will show if the work has been the means of bringing the tree into fruit. Finally, these two operations are the most complete substitute for root prunning, which is too expensive and generally unnecessary in orchards of any extent.

Ringing the Peach.

In the May issue of the Queensland Agricultural Journal, a short paragraph appeared referring to some experiments carried out in ringing peach trees at an experiment station at Bologna, Italy. In the most recent issue the manager of the Roma State Farm, writes, "As something in the same direction was entered upon at the Roma State Farm last season, a few notes on the results, as far as has been gone, may prove interesting.

For the uninitiated a brief outline of the process will be given.

Cincturing consists in the removing of a ring of bark from the stem or a branch or branches of a tree, for the purpose of obtaining more fruit, better fruit, and earlier fruit. It is also used by the horticulturist for other purposes.

The incisions for removing the bark in the case of trees are generally made with an ordinary strong pocket knife, as deep as the alburnum, or woody portion of the branch, and great care must be exercised so as not to injure this in any way.

This operation does not interfere with the upward journey of the sap, if carried out carefully, as it is the sap wood or alburnum, which takes the principal part in its conveyance, but it does upon its return by the liber, or inner bark, after having become elaborated, with the consequence that it accumulates above the incision, resulting in a thickening of the stem, the production of more flower buds, which set better, and ultimately better and earlier maturing fruit are obtained.

The operation cannot be practised every year, as it enfeebles the plants or trees to a more or less extent.

For the experiment here three trees, set out five years previously, which, though they had made extra vigorous growth, had produced very little fruit, and were, therefore, very suitable subjects, were sefected, and treated as follows :—

No. 1.—Had all its branches cinctured.

No. 2.—Control.

No. 3.—Had one branch cintured.

A dressing of the fertiliser recommended by Mr. Brunnich for de-

iduous trees was applied to each, nd resulted in the untreated tree roducing more fruit than it had one previously. The bark was emoved from the branches in a piral fashion, so that, although hey had been circumscribed, a otal severance of the top from he bottom portion did not take lace. The operation was carried ut when the buds commenced to well.

On No. 1, cuts from half an inch o an inch in width were made. There was no marked difference in he yield of fruit resulting from his, but at the close of the sea-on it was noticeable that the maller incision had completely ealed over, thereby affording no nducement for borers, etc., to get footing, whereas the wider inci-ions, though nearly covered over, id so. It may be stated here hat all cuts were tarred over as precautionary measure against utside injury. The tree bore a ood crop, considering the dry eason and its previous perform-nces, of good, even quality fruit, he earliest of which ripened before ny on the untreated tree by from en to fourteen days. Though no est was made as to whether the uit would hang after ripening, ractically no windfalls were ga-hered; a very few dropped off at toning time.

From appearances it is believed hat the effects of the treatment vill be more marked next season, nore especially on the wider-cinc-ured branches, as very few sterile uds are noticeable throughout the ree, they being much plumper and etter grown than usual. This nay be due to a certain extent o the manure already mentioned, ut not wholly so, as the remarks n No. 2 tree will show.

No. 2—Though so far as appear-nce went, there was no great dif-erence, if any, in the amount of lossom on this tree and No. 1, ewer set for fruit, and again, at toning time many more were de-ached, so that at maturity only alf as many were found. Individual uits of as good quality as on No. 1 were met with, but as a whole, they were uneven in size nd of poorer appearance and avour.

This tree contains many more lind buds, and from present ap-earances will not produce one-uarter the blossom that No. 1 ree will; but it is slightly early et to make comparisons in this irection.

No. 3.—The branch operated on n this tree bore the bulk of the fruit, all of which was of even size and quality. It produced also the first ripe fruit on the tree. The fruit on the other portion was similar to that found on No. 2.

No differences in quality of growth were noticeable in any instance.

Cultivating Strawberry Plantations.

It is late for setting out young plants in all but the coldest and latest situations. The essentials to free fruiting, health in the plants and fine size and quality in the fruit may be summed up in the words — a favorable soil and climate. The straw-berry will grow almost anywhere, but it attains perfection as a fruit only in comparatively cool and protected regions, therefore its proper place is our highest hills. Young plants should now be rooting freely, and the main concern of the grower should be to provide a large body of free, sweet soil. Plants more advanced and capable of yielding fruit should not be deeply cultivated, as surface root-ing is more conducive to fruitfulness than is deep rooting, and it is only when plants are young and weak that their roots should be encouraged to descend. Until the flowers appear the land should be freely worked and cleaned, the hand hoe being employed between the rows where cross work-ing with a horse implement is not possible. Only weak plants should be mulched before the appearance of flower, for if strong plants are mulched early they are liable to run to leaf and prove fruitless. It nearly always happens that in planta-tions of any size some parts bear much more freely than do others, and this should furnish a guide for the manuring, cultivating and general treatment of the plants. Don't man-ure and cultivate all alike, where the varieties, soils and situations vary, but give each attention according to its own special wants. Lime should be freely used in all strawberry plan-tations at this season. Lime sweetens the soil and makes available all its inert food supply. It also creates new stores of plant food, is a neces-sity of itself, and does more to keep down rust and insect pests than any-thing else which can be employed. Slake the lime in small heaps under-ground, that is by burying in holes where the soil is no more than damp, and when the lime is like flour sow it evenly over the strawberry land, taking care to well dust under the leaves of all dirty and sickly plants. A good liming before the leaves start will secure a clean, free growth, and go far towards securing an even crop of well grown fruit. Where mulching is practicable the material should be got ready at once. Many object to mulching, on the ground that it begets insects and disease, but that is absurd, for the plant must be fed, and if the mulching material is clean itself, and it ought to be, and placed in clean ground—and lime will secure cleanliness to both—then the planta-tion stands to benefit in every way. Fill all gaps with strong young plants, which can be lifted with a ball of earth to their roots. Slice off some of the leaves from excessively strong plants which show no signs of fruiting, and carefully note result, as it often happens that a little more or less foliage has a good deal to do with the powers of fruiting.

PLENTY ON HAND.

Servant: "Please, sir, there's a man at the door with a bill."

Mr. Owens: "Tell him we are well supplied."

Early Tomatoes at the Hawkesbury Agricultural College.

— £130 from One-Third of an Acre. —

The prices received for tomatoes raised at the College, writes the Agricultural Gazette of N.S.W., and placed upon the market before the bulk crops come in, are so very satisfactory that a description of our methods should prove valuable. It is necessary to force the growth of the young plants during the winter months, and to protect them frost; and it is also essential to plant them in the field, and prune them in such a manner as to ensure their ripening as early as possible; but the results more than justify the small expenditure and the considerable amount of light labour required.

We have sold £130 worth of fruit from a third of an acre of land. It is not our practice to dispose of all the fruit grown on this third of an acre, devoted to early tomatoes each year, as the needs of the College, with its staff, students and visitors, averaging more than 250 per day, have to be met first. Our very earliest tomatoes are not sold, but the price is ascertained at the date they are available, and the account for maintenance is debited with the value of all tomatoes supplied for College consumption.

The following prices were those actually received for tomatoes grown at the College, and sold through an agent at the Sydney fruit markets :—

Date.	Price per half case.
30 November, 1911	8 0
4 December, ,,	8 0
8 ,, ,,	7 0
11 ,, ,,	6 6
14 ,, ,,	6 6
15 ,, ,,	6 0
20 ,, ,,	6 0
27 ,, ,,	6 0
2 January, 1912	4 6
11 ,, ,,	6 0
15 ,, ,,	5 0

In November they were 10/- per half case, but none were actually sold at that price, though a supply was available for College consumption.

These figures will show the return which may be expected from the labour devoted to the growth of early tomatoes. To a man who has a small area of sandy loam, handy to market, with facilities for irrigation and an adequate supply of farmyard manure, the industry offers a splendid chance. Probably there is no other crop which will give such quick returns from a small area.

— The Method Outlined. —

The dates upon which the several operations can be safely performed naturally depend upon the district. The tomatoes should not be planted out in the field until all reasonable danger of severe frosts is passed. Consequently, an "early" district has an advantage over a "late" one. Ours is not an early district by any means, as the belt of country in which the College is situated is far more subject to frost than, for example, the lower part of the Hawkesbury Valley.

Our seed is sown about the middle of July, in seed boxes covered with glass and placed in a hot bed, where the growth of the young plants is forced, and they can be covered from frosts at night. When the plants are about 2 inches high they are transplanted into 3-inch pots, and the pots are plunged into the hot bed, where the young plants can still be protected at night. About the third week of September they are set out in the field. If the weather looks threatening after that (a peculiar hardness in the air generally indicates a coming frost), a ti-tree bush is placed on the south-west side of each plant. The tomatoes are grown on trellises, 4 feet or 4 feet 6 inches apart, and are placed 15 inches apart. They should be pruned to one main stem. The average yield is about 20lbs. of fruit per plant, and, as indicated above, the first fruit is ripe towards the end of November.

Now for the details.

— Varieties. —

The variety always used for early fruit at the College is Spark's Earliana. This is a very good tomato, fairly smooth and round, and admirably adapted for trellising and pruning. In a number of comparative trials at the College it has always come out best for early fruit.

Burwood Prize, a tomato largely grown, is not suitable for this purpose. Its growth is very sturdy, and it is not adapted for trellising; and, moreover, it is not nearly as prolific as Earliana.

Dwarf Champion is a good bearing variety, and does not require staking. It is used at the College for midseason sowing for main crops. As tomatoes are cheap in season we do not attempt to trellis or prune this variety.

For late fruit, in a district suitable for such crops, Spark's Earliana could be used again. We do not attempt the winter crops, our latest tomatoes being picked about the middle of May. These are Dwarf Champions, and the seed for this is sown late in January.

To sow half an acre of Spark's Earliana, two ounces of seed will be found sufficient.

— The Hot Bed. —

For half an acre of tomatoes the hot bed will need to be about 24 feet long by 6 feet wide, if it is proposed to set out the plants about 2 inches apart each way without pots. If 3-inch pots are to be used, which we practise and recommend, the hot-bed will need to be proportionately larger for the same area of tomatoes.

A few loads of fresh stable manure are put in a heap, and allowed to heat for about a fortnight. When quite fresh it heats too rapidly, and will burn the plants, so it should be allowed to ferment a little before use, and turned over at least once to regulate the heat. This should be spread out evenly to a depth of 2 feet on the surface of the ground facing, for preference, the north-east. The quantity of manure required can be gauged from the size of the hot bed proposed to be made.

Around the hot bed build a frame of battens, 2 feet high at the back, and 18 inches high at the front above the level of the manure. Cover the sides and ends with bagging or other such material. Over the top, place a hessian blind fastened at the back, and at the front put a long piece of round wood, upon which the blind can be rolled back to admit sunlight and air. Glass is largely used for covering the frames, but we find the hessian blind quite as satisfactory and much less expensive. The blind is let down at night to protect the plants from frost, and rolled up in the morning.

— The Seed Boxes. —

These may be made from kerosene cases. One side of a case is removed, and the top closed so as to give a flat box about 10 inches deep. Put 3 inches of rotten manure or similar material in the bottom for drainage purposes, and

then 3 inches of nice, free, sandy soil. This will leave about 4 inches of space for the seedlings to grow. Sow the seeds in the box, and place a sheet of glass over it in order to exclude the cold air. Plunge the box into the hot bed, so that the heat may germinate the seeds. Draw down the hessian blind each night. As the plants come up, the glass cover is gradually tilted back to give ventilation, until eventually it is removed altogether.

Four such boxes will be enough for half an acre of tomatoes.

The seedlings must be taken out of the boxes as soon as they are strong enough — generally when about 2 inches high. If left too long they will grow spindly and possibly "damp off."

— Planting in Hot Bed. —

The practice of pricking the young seedlings into 3-inch pots, and plunging the pots into the hot bed, is preferable to planting direct into the hot bed. The advantage is that the plants can afterwards be turned out of the pots into the field without suffering any check. In case the pots are not available, however, 4ins. of soil may be put on top of the hot bed, and the seedlings planted out 2 inches apart. This will necessitate much care when planting in the field afterwards; otherwise the plants may receive a severe set back.

In the hot bed, whether in pots or not, the plants should be shaded from the bright sun for three or four days after setting out. Then all shading is removed by day, but at night the hessian blind is let down to protect them from frost. The tomatoes are kept under shelter in this way until all reasonable danger of severe frosts is gone.

— Trellising. —

As already stated, the plants are put in trellised rows 4 feet or 4 feet 6 inches apart, and 15 inches apart in the rows. The trellises at the College are made of 3in. by 2in. or 3in. by 3in. posts, 9 feet apart, with light 2in. by 1in. battens nailed to them, and laths fastened perpendicularly every 15 inches. But where a man has land in such a position that long rows can be laid out, it will be cheaper to use wire to support the laths. Posts can be placed 18 feet apart, and two wires run—one a foot from the ground and the other 4 feet above—so that the top wire is 5 feet from the ground. The posts, of course, need not be of sawn timber. The laths may be fastened to the wires every 15 inches with string or tie wire. Builder's laths, bamboo sticks, or light saplings will do for the laths. They should be long enough to extend from the ground to well above the top wire. Stout wire is sometimes used for laths, but this often burns the plants in hot weather. A tomato plant is set out at the base of each lath.

After planting out, we watch the weather for late frosts. In such cases our practice is to put a titree bush on the south-west side of each plant. This shelters the plant from the cold winds, but leaves it open to the sun on the north. We have never lost any tomatoes by frost.

— Pruning. —

This is the most important operation in the whole process. It is no exaggeration to say that, by careful pruning, tomatoes can be made to ripen a month earlier than they otherwise would.

All lateral growth of shoots is pinched off, leaving only the main stem, which is trained up the lath. A lateral shoot starts from just above a leaf on the main stem. The leaf must not be interfered with, but the shoot pinched off as close to the stem as possible without damaging the leaf.

The trusses of bloom which give the fruit are thrown out along the main stem. Care must be taken not to injure these when pruning. When the main stem reaches the top of the lath it may be pinched off, but not before. This pruning should be practised regularly, about once a week. Wherever laterals appear they should be pinched off.

The tomatoes will start to ripen from the base of the plant, and the ripening will proceed gradually towards the top.

— Watering. —

The tomatoes, whether in the seed box, hot bed, or in the field, must be regularly but not excessively watered. The soil should be kept always in a moist, growing condition. Harm can be done by too much watering, but soil should never be allowed to get dust dry. At the College we irrigate tomatoes and vegetables with effluent from the septic tank.

If there is danger of frosty nights, the best practice is to water the young seedlings in the mornings. If the plants are watered in the evening and a cold night follows, the plants will receive a check. In warm weather, however, watering at night is the rule.

— Spraying. —

Our early tomatoes are sprayed occasionally to prevent Black Spot, using Bordeaux Mixture at the summer strength. This is prepared from copper sulphate, 6lbs.; lime, 4lbs.; water, 50 gallons.

If the weather is wet, we may spray once a fortnight, but in fine weather it is not necessary to spray so often.

— Conclusion. —

It will be seen that the growth of early tomatoes is an industry which gives large returns from a small area, and one which requires the expenditure of very little capital though a good deal of labour. This class of agriculture is one which has not yet been developed in this "land of great distances," but we are fast approaching the time when land close to large markets will be valued for its total productive capacity. In the meantime these notes may be of use, not only to those who may wish to make a complete living from the industry, but also to those who love this delicious fruit-vegetable, and wish to have a supply for household use at a time when fresh tomatoes are obtainable in the market only at fancy prices.

A fellow whose appearance warranted the belief that he had quarrelled with soap and water some years ago applied for a position as porter with a large concern where help was badly needed. The manager looked him over doubtfully. Finally he handed him half-a-crown.

"Go up town and take a bath," he told him. "Then come back, and maybe I'll be able to take you on."

The fellow started for the door.

"And, oh, by the way," the manager called after him, "if there's any change left take another bath."

Budding the Vine

M. Blunno, Viticultural Expert in the Agricultural Gazette of N.S.W.

The system of grafting vines generally known and accepted is practised at the end of winter or early in spring. The stem of the vine to be grafted is cut off level with the ground, and a scion inserted into a cleft made in the stem; or if the vine to be grafted is but 12 months old, and the stem about the thickness of a vigorous cane, the whip and tongue graft is used instead.

I shall deal in this article with a system of grafting which is really "budding," but it is a different kind of budding from that often attempted on the vine, and ever attended by failure. The system of budding adopted for roses and fruit trees seldom if ever succeeds when attempted on the vine. The method which I am about to describe is based on the same principle, but varies in its details.

This system of budding was called the "flute-graft of the vine" by the late Signor Sante Caravella, Foreman at the Royal Viticultural Station, Palermo, Italy, who, after a series of experiments in vine-budding, gradually improved on the old one, which was hardly ever attended by success. The name adopted to indicate this method of grafting is perhaps not entirely illustrative, it being somewhat different from the real flute-graft adopted in the case of certain trees—e.g., the chestnut. However, we will accept the name as more indicative than illustrative.

The reconstruction of vineyards on Phylloxera-resistant stocks, in which a large number of growers are engaged throughout nearly all the vine-growing countries of the world, made the question of vine grafting a very important one, because the European vine is grafted on a stock which truly is also a vine; but it is a vine originating in another continent. Botanically they are close to one another, but not identical; they belong to different genera.

Persons interested in the viticultural industry have heard often enough that, in the reconstruction of vineyards on Phylloxera-resistant stocks, care must be taken that a suitable affinity exists between stock and scion. Those engaged in the work have met with various difficulties, and some of the difficulties encountered, as some of the failures recorded, were wrongly put down to causes often wide of the mark, but evolved to give some plausible reason for the failure, or partial success, of the reconstruction. Many vignerons would more easily and directly find the reason by examining that part of the vine where the grafting was done. The time-honoured system of grafting the vine is good and irreproachable from the theoretical as well as from the practical point of view. Neverthe less, when the devastion caused by Phylloxera rendered it necessary to graft several thousand millions of individual vines within a relative short number of years, it was then found that, in addition to the want of affinity between certain kinds of resistant stock and certain varieties of vines, there was, and there is still, another difficulty, viz., that connected with the necessary skilled labour to do the operation neatly and carefully. The operation, although of a very simple kind, requires a certain amount of patience and practice. When vine-growers in Europe had before them the gigantic task of having to reconstruct millions of acres on Phylloxera-resistant stocks, the genius of a few of them evolved several new systems of field and indoor grafting, some of which got the sanction of experience, and these, if they have not come into general use, at least have been adopted in special districts, where the man who conceived the idea popularised the system among his neighbours.

These two questions — the adaptation of the resistant stock to the soil, and the affinity between stock and scion—are often considered the two principal ones on which depends the successful reconstruction of a vineyard. Having had many years of experience, I would say that reconstruction also depends largely upon a good and suitable method of grafting, as well as upon the number of vine-dressers skilled in the operation that are available in the district.

Budding can be done on a vine-rootling as well as on an older vine.

— Budding Old Vines. —

On an older vine the operation is carried out as follows:—

Take a vine shoot of the ordinary European vine, from which all the side shoots were nipped off when just starting to grow—that is, when not more than 1 inch long. With a sharp budding knife make a cut right round, three-quarters of an inch above, and another below a bud; also a cut lengthwise opposite to the bud. Lift the bark carrying its eye. The same operation is done on a shoot of the Phylloxera-resistant vine.

The bud of the European vine, with its section of the bark, is then placed on the denuded section of the shoot of the resistant vine, fitting the bud on the spot from which the bud of the America vine was removed, and covering the section of the wood denuded of its bark with the bark of the European vine, so as, if possible, not to leave any part of the wood unprotected. It follows that the shoots of the European vine which serves as scion, and that of the resistant vine serving as stock, should if possible have the same diameter, so that the bark of the former shall completely cover the denuded wood of the latter right round. If the shoot of the European vine be somewhat smaller in diameter, then in removing the bud and bark from the shoot of the resistant vine a small strip of bark is left in the position opposite to the bud. This strip should never be larger than one-fourth of the circumference of the shoot. In other words, if the bark of the European vine covers less than the three-fourths of the circumference of the shoot of the resistant vine the operation will fail. The European bark should at least coincide on one side with the strip of the bark of the resistant vine.

Then raffia or wool is wound round the graft. The ligature should be close and tight, so as not to leave interstices, and should also be extended about one eighth of an inch beyond the top and bottom ends of the operated section. The ligature near the bud should fix the bud tightly on the small wooden knob on which the bud of the resistant vine rests. Naturally the European bud is not covered by the ligature; on the contrary it should remain quite free and unhampered. The ligature is wound near the bud, so as to catch it in a V.

As the operation is carried out in summer, a vine leaf is placed round the section thus treated, in order to protect it from the direct sun for the first few days. A fortnight later the

top and bottom hoops of the ligature are cut, to ease the ligature as the shoot grows in thickness, and to prevent strangling. A week later a longitudinal cut is made on the ligature, but it is left in its place; the shoot as it grows in thickness will shell off the ligature.

For the success of the operation, it is not necessary to place the European bud on the place from wh ch the bud of the resistant vine was removed, but it may be put on the wood between the two knots.

Not only can more than one bud be put on the same vine, but on the same shoot of the resistant vine more than one bud can be placed. A grower who wants to produce budded cuttings can place buds at a distance of 15 to 18 inches apart on the same shoot. To do this, the shoots of the resistant vine are run up to a tall vine stake, so to avoid their twisting and bending. At pruning time the shoots is cut into lengths, taking care to leave on top of the European bud the full length of a merithal, with a bud of the resistant vine, which bud is removed before planting. This operation is called "stagging."

I have described the system of budding when it is desired to leave the bud dormant—that is to say, when the bud will sprout in the following spring. However, the bud placed in summer can be made to shoot in the same season. All that is required to obtain this is to cut the shoot off 6 or 7 inches above the bud, after making sure that the bud has taken. A fortnight after the shoot has been so cut off, the bud begins to sprout, and by the time the vegetative period ends, the shoot from the European bud will have attained a considerable development in length, diameter, and general vigour.

— Preparing for Budding. —

The vigneron intending to adopt this form of grafting on vines should begin by suckering the Phylloxera-resistant vines in the early spring, and also by thumb-pruning all superfluous shoots, leaving only four or five, and should tie these upright to a stake. If the stock is very young, then only one or two shoots are left, so that they may attain sufficient vigour; all the others are removed. Then all the side shoots, or second growth on the remaining shoots, should be nipped off as soon as they show themselves. They should not be allowed to grow more than an inch or two before they are pinched off; otherwise the bud and bark cannot be removed clean off. The European vines from which it is intended to take the buds must be likewise attended to; the shoots that will supply the buds must have the side shoots nipped off as soon as they appear. If this is neglected then the side shoots grow too tough, and the bud with its section of the bark cannot be detached clean; also it is likely that the bud will come off the shoot with a hole corresponding to the position of the side shoot, and if such a bud is used the operation is sure to fail. Sometimes even if the leaf-stem is too thick and ligneous, as is often the case with certain varieties, in detaching the bud with the section of bark attached, a clean round hole is seen near the bud, corresponding to the position of the leaf-stem. Such buds cannot be used and must be rejected. It is also necessary that the cavity under the bud corresponding to its core be clean and free from any woody tissue.

The shoots of the European vine which have to supply the buds are cut off the mother vine. All the leaves are cut off. The cutting off of the leaves helps the shoot to keep fresh by preventing the evaporating which otherwise would take place. The shoots are then put in a bucket with 5 or 6 inches of water; that will be sufficient to keep them fresh. Enough shoots are cut in the morning to last for the number of buds that can be made by noon. A fresh supply is got on resuming the work in the afternoon, to last till the end of the day's work.

— When to Bud. —

Of course, all depends on the season, as well as on the variety of vine that it is desired to propagate. It can be started when the shoots have attained such size that the bark can be easily removed. If too early the bark cannot be removed, because what the botanists call "differentiation of tissue" is not complete yet.

— Budding on European Stocks. —

In the foregoing I described the operation of budding on a Phylloxera-resistant stock, and I hardly need to say that the system applies to any ordinary vine. Buds of a certain variety of European vine can be applied on another European sort, when the grower wishes to change the kind of grapes. So, if he be not satisfied, say, with Late Sherry, and he wants to change it into Black Hamburg, he may put a couple of buds or more of Black Hamburg on to the Late Sherry.

— Budding Young Vines. —

Young vines can be budded in the nursery bed—that is to say, on a young rootling. In this case it is not likely that any of the shoots will be strong enough the first year to allow the operation to be successfully performed, unless the young plants were purposely planted distant enough from one another for the shoots to attain a sufficient size. The practice, therefore, is to put the bud on the stem—that is, on the wood which is already in its second year. In placing the bud it is desirable to put it on the small knob which marks the spot where the bud was on the cutting from which the plant was raised.

— Advantages of Budding. —

This system of budding has some special advantages over the ordinary split or whip and tongue graft.

The union is perfect, as there is no splitting of wood as in the two systems mentioned; thus many inconveniences peculiar to vines grafted by those methods are avoided, such as dwarfed and pinched shoots, dry not round or inside the zone of the graft, chlorose or yellow desease, and the reddening of the leaves, which are all symptoms that the union between stock and scion is not perfect.

The shoot coming from a bud will bear grapes the following year, therefore there is a gain of one year's crop.

It is a system of graft that will succeed in all soils, whereas the other systems will give a lower percentage of successful unions in heavy and cold grounds.

After some practice a man can do from 110 to 120 a day. By the other systems a good man can do as many as 300 in a day, provided he be assisted by a lad, who removes the soil round the vines, cuts the stem off, puts clay or grafting wax round the graft, and earths up the soil round the graft in a mound, thus leaving to the man the splitting of the stock, the wedging of the scion, its insertion, and tying up the graft. If one man had to do everything, it is not likely that he would average more than 180 a day. In any case, budding is a slower process of vine-grafting, but the great advantages which it has, consequent on a perfect union being formed between stock and scion, justify the adoption of the system.

At any rate, a vine-grower may apply both systems in the reconstruction of his vineyard. He can utilise the end of winter and beginning of spring for the usual grafting, and when he can carry it on no longer because of the vegetation being too far advanced, he can make ready for the budding. In a word, by bringing into use the system of budding, the time available for field-grafting is doubled, and that is certainly a great boon.

Furthermore, all those grafts that were done by the split or whip and tongue systems, and have failed, can be budded later in the season. On such grafts shoots will soon grow from the stem. Two of them are left and allowed to grow; all the others are rubbed off. On those left a bud or two are placed as soon as the shoots are strong enough.

Before closing the discussion, one last hint will be found useful. It is not necessary to take the buds of the European kind from a grape-bearing shoot. A non-bearing shoot, or even a side shoot, can supply the buds, which experience has shown to be as fruitful as the others.

The original article which appeared in the July issue of the Gazette is well illustrated from photographs. Any one interested in the matter would do well to send for a copy to the Dept. of Agriculture, Sydney.

The Olive.

By L. Macdonald, Horticulturist, Dookie Agricultural College.

The olive is one of the easiest trees to raise. It is propagated either from seeds, cuttings (as trucheons, hard wood, or terminal cuttings), sprouts, stools, or the excrescences found on the base of the tree.

— Seeds. —

Like the peach, apricot, and other deciduous trees, the olive fails to to come true from seed; and, in the majority of cases, there is a reversion to more or less wild and worthless types. Hence, all seedlings, except those that are retained where it is desired to raise new varieties, should be worked over with selected varieties, either by budding or grafting.

The seed may be planted out in the open nursery or started in small beds where conditions can be controlled better, and planted out in their second season's growth. The latter is, perhaps, the more suitable method. In either case, the soil should be well prepared. The seed should be obtained, if possible, from selected trees. The pulp should be thoroughly removed before planting. A good method of doing this is by soaking the seed in an alkaline solution made up of ¼ to ½ lb. of caustic soda to 1 gallon of water. Cracking the outer shell can also be adopted, but should be carried out with care so that no injury may be done to the kernel. This is a slow process and is not recommended for general purposes.

The seed should be sown 1 to 2 in. in depth and covered with some friable material. Where surface watering is adopted, a light mulch of short horse manure, or some such material, is advantageous, as it prevents the ground "caking" on top or cracking.

Germination is often tardy and irregular where no injury has been done to the outer shell, the seed sometimes remaining in the ground many months without making growth. Quicker results are obtained with those seeds whose outer shell has been injured in some way, thus permitting the moisture to gain more ready access to the kernel. Seeds may be sown as soon as the fruit is fully ripe or at any time through the winter months, say from May to September.

— Cuttings. —

The various sorts of cuttings are used chiefly for reproducing

selected varieties. They may, however, be worked over with other kinds by either budding or grafting. This is sometimes done to diminish or increase the vigour of certain varieties.

— Truncheons. —

These may be obtained from heavy limbs split in quarters, or from round branches 1 to 3 ins. in diameter. Those of a diameter from 2 to 3 ins. are the most suitable for planting out. They should be about 15 to 20 ins. in length and should be taken from the trees in June, July, or August. All side shoots should be removed and care taken not to bruise the bark. When planting in the nursery, it is a good plan to place the truncheons at an angle in the furrow, tread firmly, and cover over completely with soil, taking care to leave the top of the cutting close to the surface in such a manner that it will remain moist and gain a sufficiency of air. Several trees may be obtained from each truncheon in this manner, as they often develop sprouts and roots along the greater part of their length. If only one shoot is desired, the most suitable should be selected and the others removed.

— Terminal Cuttings. —

These are made from the tips of the shoots after they have passed the herbaceous stage ; they should be cut about 6in. in height. All of the lower leaves should be removed immediately after cutting, to prevent evaporation of moisture and consequent wilting. The end for planting should be cut off close to a node, as they callus and root better when cut in such manner. Those cuttings with the buds close together are the best. They should be planted in a compost containing a good proportion of sharp sand and be kept continually moist. This kind of cutting is best started in lath or shelter houses or in frames, and planted out when well rooted. Cuttings of old wood below an inch in thickness should be of lesser length than the truncheons, and should be started in the nursery.

Cuttings are considered the quicker method of raising selected varieties. They come into bearing earlier, but are supposed to be shorter lived. It is possible that, in poor soils or trying situations, the seedling may be the more thrifty and long lived tree, but experience in this country has not gone to prove that this is the case. Many of the oldest trees in Australia were raised from truncheons and are still doing well. However, their age is comparative youth in the life of the olive tree, and perhaps it is as well to accept the opinion of continental writers on the greater longevity of seedlong trees until there is greater evidence at hand to the contrary.

— Sprouts. —

These may be obtained from the base of old trees, a good shield-shaped piece being cut off with each. They should then be shortened and treated in the same manner as terminal or small cuttings. They may also be obtained from truncheons where good growth is made and a rapid multiplication of numbers is necessary.

— Stools. —

This is a rapid and effective method of obtaining rootlings for transplanting and working over or for increasing a selected variety. Well established young trees are cut down close to the ground. A number of shoots develop from the adventitious buds that break out on the stub. The earth is then moulded up over the base of these and if kept moist rooting soon takes place. When the shoots are well-rooted, the soil is broken away and the shoots removed with a sharp knife or secateur. A fresh batch may then break out and can be treated in the same manner.

— Eyes. —

This is a term used for the excrescences that occur around the lower part of aged trees. They may be used for propagation and succeed best where bottom heat is available. After removal with a sharp knife, they should be planted about an inch in depth in the same manner as seeds, covered with some friable material, and kept continually moist. When sprouting occurs, they should be removed to the nursery. They require skill, and are not recommended except under circumstances where conditions may be controlled.

Lavender Cultivation.

By Joseph Knight.

The establishment of the essential oil industry, like many others of a similar nature, has been attempted in this State, but, from various causes, has not been followed up — notwithstanding that liberal assistance was offered by the State Government, and satisfactory results as to yields, etc., obtained. Things are now, however, becoming more satisfactory for the grower in this regard, and, with proper care and attention, it may well take its place amongst the profitable minor industries of the rural population. The producer should be content to produce the flowers and dispose of them to the distiller, or where this is inconvenient, distill them and dispose of the oil to the wholesale chemist, and not try to manipulate it further by attempting the making up of perfumes. Such attempts have often been made heretofore and failed.

Lavender (Lavendera Vera or Levendula Augustifolia) is one of the hardiest of herbaceous plants, and thrives under a wide range of conditions of both soil and climate—even poor, sandy, or loamy soils are agreeable to it, and these conditions are recognised as resulting in the production of the finer class of escential oil. One condition of soil is very necessary, and that is, it should be free from possibility of water-logging. Excessive moisture at the roots soon causes the plant to perish. Low, wet land should, therefore, be avoided, unless it is well drained.

— Raising Plants. —

Plants may be obtained from either seed or cuttings, but the best method of propagating is by cuttings, and these should always be selected from the best plants available. Slips from 4 to 5 inches long—no matter how fine or small—may be planted out in a nursery bed, close in the rows, even touching. If the cutting be 4 or 5 inches long, 1 inch to 1½ inches above the ground is sufficient. The nursery rows should be sufficiently far apart to permit of the ground being kept loose and clean. The cuttings should be planted early in the autumn, when they will reach the stage in which they may be planted out in their permanent places in the following spring. A few blooms will show up sufficient to indicate what the plant is like.

— Planting Out. —

In planting out permanently the distance apart must be regulated

by the class of labour to be subsequently employed. If horse labour is to be used in the after cultivation the distance between rows should be from 4 to 5 feet. If manual labour only is available then the plants may be grown closer, say, 3 to 4 feet, or, if it can only be ploughed or worked one way with the aid of horse labour, then the plants may stand 4 feet by 5 feet or 3 feet 6 inches by 5 leet. The plant, when developed, will spread out to cover ground from 1 foot 6 inches to 2 feet in diameter. There is no economy in close planting—the plant should have sufficient feeding ground, or it will become stunted, and the yield of flowers small and pinched.

The securing of proper cuttings is important, and care should be taken in this respect. There are a number of mother patches available, and a limited quantity may be obtained from the Labour Colony, Leongatha, by writing to the manager, who will supply them in bunches f.o.b. rail Leongatha at 3/9 per 1,000 cuttings. In commencing this business it is important that plants should be secured early. Cuttings may be planted out at any time in the autumn or spring, but, if too late in autumn, the growth will be retarded by the cold, wet bed, and if late in spring, with dry, hot weather. In planting, little can be done by way of regulating the length of stem above or below, but deep planting should be avoided. The plant should stand the same depth as when in the nursery bed; mistakes are made in this respect frequently, and the plant too much buried. Spread the roots well and tramp the soil firm. Avoid planting when soil is wet or otherwise out of condition.

— Preparation of Soil. —

As the profitable lifetime of the plant runs for seven or eight years the soil should be properly prepared prior to planting, as is is impossible to do much after, beyond cleaning and ploughing shallow betwixt the plants. The plant will repay the labor for subsoiling, as the roots will be enabled to penetrate to a depth that will enable it to withstand the changes of excessive drought and wet. Subsoiling is preferable to deep, single ploughing, as the surface soil should be kept to the surface; and the cold, stubborn bottom soil should not be brought to the surface, as this soil is usually infertile and difficult to work. Whatever system is adopted, the soil should be well worked and pulverized to a fair depth, so that the young plant may be enabled to push its roots freely.

— Cutting or Harvesting. —

The flower opens out on the stem somewhat irregularly, so care should be taken, when harvesting, to take them when the maximum amount of flower has opened out. The flowers are gathered in one hand and cut with a hook or knife below the bloom and above the foliage, and laid out on sheets of hessian, but not exposed to the burning sun any more than can be helped, as the essential oil is apt to escape. If intended for sale in the green state, the cut flowers may be spread out for a few hours in the shade, but the quicker it is taken to the still the better for all concerned. Avoid placing in bags, as it heats readily, and damages. If sending it away any distance it should be sent in crates and packed in thin layers—not more than 2 or 3 inches thick, so as to avoid pressure. The present price for this form of produce is 3d. per lb. in the green state delivered in Melbourne. It it is inconvenient to market it in this form the flower may be spread out on trays, boards, or hessian in the shade, and dried, when it may be packed carefully, so as to save the blooms, which separate freely from the stem. As the bloom is the most valuable portion of the product, care must be taken in this respect. The dried flowers, with stems, are valued at about 5d. per lb., but buds alone are sold for a price much beyond that.

The cutting of lavender commences about December, and arrangements should be made beforehand with the distilleries, as their intake must be regulated by their capacity for treating same. Failure in this respect may mean the loss of the crop.

— Treatment of the Flower. —

As stated above, the flowers are gathered and laid out on hessian and taken to the still. If they are sold to the distiller they must reach him in a sound condition, and it would be advisable, where they cannot be delivered within twenty-four hours or so, to spread them on some kind of trays, in a thin layer, so as to avoid heating, which destroys the blooms. It is better to market in boxes, fitted with trays inside, to prevent the weight of flowers pressing on each other. The depth of these on the boards, or netting, should not be over 3 inches, and they should carry their own weight of flowers separately. By this means there would be little danger of it damaging by heating. It is frequently the case that flowers are gathered and put up in sacks and sent on; on arrival at the destination they are found heated and and black; and, of course, valueless.

It is desirable to market green if possible, but when this cannot be done then the flower may be spread out on any clean bottom and dried, and marketed dry, but the drying should be done in the shade and not in the sun.

The other alternative is distilling and, as but little skill is necessary, women and youths can be entrusted with the work, and,

with proper appliances, should be light and pleasant employment.

— After Treatment of Plant. —

The annual cutting back of this low, bushy plant forces out a super-abundance of branches, and the plant becomes so close and dense that it is readily attacked by fungoid and other diseases; and, in order to avoid this, the plant should be thinned out during the dormant season, and the air let in. This will considerably improve its vigor and increase the yield of blooms, which is the object aimed at. The pruning should be done as low as possible so as to avoid the production of superfluous buds, and much may be done by rubbing these when going through the plants. Lavender, like most other plant life, when employed for man's use, will repay for a little attention.

— Yield. —

It is somewhat difficult to give actual yields, as much depends on the varying conditions under which they are produced. For instance, the Governor of Pentridge, Mr. Cody, planted out a small area, about half an acre or so, and the returns given from this were highly satisfactory, but, as portions were taken from one, two, and three year old plantings, the actual returns would be of little service. Suffice it to say that, on his retirement from the Government service, he is entering into lavender cultivation on a much larger scale. The yield of flowers per acre varies, but may be put down to about 3 to 4 tons. The price at present is 3d. per lb., and gives over £50 per acre.

Mr. J. Blogg, of Messrs. Blogg Brothers,, Melbourne, the well-known perfumers, estimates the yield of oil at 40lbs. per acre. The late Mr. Slater, who was well up in this business, gave the yield at 56lbs., but when we come to the price of this we are lost. Some time back I had a parcel of a few pounds to dispose of on behalf of the Government, and I invited quotations from three or four firms. One offer was made to me at 7/- per lb., and another at 14/- per lb. The third said he would give me the market value, but could not say what that was until testing it, so, on the second offerer rising to 15/- per lb., his offer was accepted. The third man then complained, and said he was prepared to go to 20/-, or 21/-, had I given him a chance. Herein lies the difficulty in dealing with all such special products, viz., the want of an established market value to regulate the price; but this will remedy itself when the trade becomes more established.

— General Remarks. —

There are other species of lavender grown, but none other than the one under review can be recommended for commercial purposes, as the class of oil produced is low in value. Lavendera Vera, or Lavendula Augustifolia, is the only one worthy of consideration, and this, like many other plants or animals, may be improved by careful selection and other means. This should be the aim of all entering into its cultivation. With the aid of a small test still individual plants may be treated, and those of the best quality carefully selected for propagation. No doubt, if this were carried out systematically, the yield would be much improved.

If we look over a field of lavender in bloom we cannot help noticing the great variation of colour of flower and form and quantity of bloom on each, and, no doubt, the oil that each contains would vary equally so. Some plants are much more robust than others, but the plant is hardy, and gives but little trouble if properly handled. If neglected, it suffers from an attack of fungus, which appears to kill out portions of the plant, but if kept open, as advised, and air admitted freely, there will be little ground for complaint on this score.—Victorian Journal of Agriculture.

A Good Whitewash.

The method of making whitewash used by the United States Government on public buildings is as follows :—

Put two pailfuls of boiling water in a barrel, and add one half-bushel of well-burnt fresh quicklime; put in quickly one peck of common salt, dissolved in hot water, and cover the barrel tightly to keep the steam in while the lime is slaking. When the violent bubbling is over, stir until well mixed, and if necessary add more boiling water so as to have the mass like thick cream. Strain through a sieve of coarse cloth. Make a thin starch of 3lbs. of rich flour and one pound of strong glue, having first soaked the glue in cold water, and to the latter add 2lbs. of whiting. Add this to the lime wash, and also sufficient hot water to dilute to the proper consistency; keep hot while applying. Six quarts of this mixture will cover 100 square feet.

The Farm

Stack Ensilage.

It is of the greatest importance that the base of a stack shall be of right dimensions, so as to ensure the least possible amount of surface exposure and the exercise of the greatest possible pressure on the lower part of the stack by the upper portion of the material. It is inadvisable to build small stacks, owing to the greater waste, consequent on the larger surface exposure in proportion to the quantity of material. A stack to contain 25 tons should be the least size that should be attempted, and where only this quantity of fodder is available, it will be found preferable to use a pit or a disused room or building, if such is available, as in the latter case even a much less quantity may be conserved. The base of a 25-ton stack should be put about 10 x 10 feet. About 45 cubic feet of good silage will make a ton. Stacks to contain from 50 tons upwards will be found preferable, owing to the lower proportionate waste, and the larger they can be conveniently built the better. A base of 14 feet square will carry 50 to 60 tons, and 18 feet square will carry 120 tons, and so on in proportion, if not built too rapidly. It is preferable to allow intervals for settlement, as by thus allowing time the stack may be more compactly built and the lift may be considerably reduced. Where a large quantity of material is available, the erection of two or more stacks may be proceeded with alternately, and thus no time need be lost. A well-drained site should be selected, and, if necessary, it should be levelled to ensure a secure base. The ground should be covered with timber or a good bed of straw, to prevent moisture rising from the soil, and all surface water should be cut off.

The best time to commence to cut grass and other natural herbage is when in flower, and cutting may be continued as long as the crop is in a succulent condition.

Wheat, barley, vetches, and peas should be in a similar stage of growth in the drier districts, while in coastal or other moist localities they may safely be cut in a more advanced condition, as in the latter places the fodder is likely to contain more moisture than is usual under the former conditions, and they do not dry off so rapidly. In dry districts it will be found advisable also to cut sorghum and maize at an earlier stage of growth than is usual on the coast, and to use pits or buildings in preference to stacks, as the comparative dryness of the fodder causes greater loss in stacks than that which occurs in the case of fodder plants of finer texture, which admit of more compact stacking than is possible with those of coarser growth.

The chaffing of maize and sorghum is recommended, and therefore their conservation in a walled receptacle is necessary to secure the best results in quantity and quality of silage. The material should be spread evenly, and if cut with reaper and binder the bands should be cut and drawn, so as to admit of more compact building and the more effectual exclusion of air. If the bands are left intact, there are liable to be considerable spaces between the sheaves if they are of full size. The butts of the sheaves should be placed outwards, each row binding the next, and the material should be well trodden from the start. Special attention should be paid to the sides and corners, so that they may be as compact as possible. The sides should be kept plumb, and the corners may be rounded off. The surface of the stack should be kept quite level while in course of erection, as if the middle be raised the material when saturated with moisture has a tendency to slip outwards; and an outward slip is much worse than an inward one, as it is difficult to remedy.

At the close of each day's work it is advisable to apply some pressure to assist in consolidating the material, and some heavy timbers of good length will be found very useful for the purpose. The weights should be removed on resuming work, but at the completion of the stack they should be allowed to remain on top. If a stack is well trodden while in course of erection comparatively little pressure will be required, 3 or 4 tons being sufficient to compress the upper portion, which in its turn provides pressure for the lower part. Should it be desired to take the temperature, a piece of metal pipe should be built into the stack, so as to admit of a thermometer being suspended by means of a flexible wire, fairly in the middle of the stack. The thermometer can then be withdrawn when it is desired to ascertain the temperature. Fermentation commences at 90 degrees F., and as it is undesirable that the temperature should rise above 150 degrees F., more pressure should be applied should it appear likely that the limit will be exceeded.

The stack when built to the required height may be rounded on top and well covered with straw, so placed as to throw off the wet, or it may be covered with galvanized iron or roofing felt. The more permanent roofing is to be preferred in districts liable to heavy rain.

A stack may be opened and fed out in eight to twelve weeks after completion, but sufficient fodder only for the day's supply should be removed. A hay knife should be used, and as little of the stack as possible exposed, the face thus opened being covered with straw or with a tarpaulin.

In free soils, or in the sandhills, which latter are frequently met with in parts of Riverina, pits for ensilage may be economically excavated be means of plough and scoop, as used for tank sinking.

The material used for fodder may be trodden by the teams engaged in filling the pits, by driving them in at one end and out at the other, and the earth which has been removed may be used as cover for the fodder, which may be raised above the ground level if so desired.

All surface water should be cut off.—Exchange.

Broom Fibre Industry.

From Victorian Journal of Agriculture.

The growing of Broom Corn for the purpose of providing material for the manufacturing of what are known as American House Brooms is an industry capable of greater development in Victoria, and it is one that should be of value to holders of small blocks of land, and particularly so where irrigation is possible. Whilst it has been amply proved that the fibre, of excellent quality, and yielding a good profit, can be grown in many parts of Victoria, considerable quantities are imported annually from oversea, and also from the neighbouring States of the Commonwealth.

At the present time, the area under cultivation is approximately 450 acres. The bulk of the locally grown fibre comes from the Ovens and King River Valleys, where it is grown on the alluvial flats having a fair rainfall, or where the land is irrigable. There are many localities in the State in which the crop could be grown equally well, and I believe that, were the knowledge necessary to produce the crop more generally acquired, the industry would be largely increased and widely distributed.

— Soils and Manures. —

Broom corn will grow well wherever maize will thrive. It is a hardier crop than the latter, standing drought to a greater extent, and making better growth under adverse conditions. It will not stand frost and is essentially a summer crop. Sandy loams and rich river flats are most suitable; stiff heavy clays are very unsuitable. Rich chocolate soils will also give good crops.

In order to get the best results, the following fertilizers should be applied about four to six weeks before the seed is sown :—

Superphosphate, 100 lbs.; bonedust, 100 lbs.; sulphate of ammonia, 50 lbs.; sulphate of potash, 30 lbs.

The cost of the whole will be, approximately, 20/- per acre. Farmyard manure, at the rate of 10 tons per acre, is especially valuable. If obtainable, it should be applied in the autumn, and worked into the land.

— Sowing. —

The seed should not be planted until danger of frost is past—from October to December. The land must also be well drained and in a warm condition. If sown in cold wet soils, it is liable to rot and poor germination will result. Seeding at the rate of 4 lbs. per acre is sufficient if sown regularly; the drills should be 3 feet apart and the plant 7 to 8 ins. in the drills. If sown too thickly, the plants will require to be thinned out, which will add at least 20s. per acre to the labour bill; the crop will also suffer in both quality and yield, the broom being faulty and of smaller growth. The seed should never be sown more than 2ins. below the surface, as the first shoot is thin and delicate and cannot force its way through, if sown deeply.

As seed is so cheap and is required in such small quantities, it is advisable to grade it, and to sow only heavy samples. Many immerse the seed in water and float the light seed to the surface; the latter is then skimmed off and thrown to the fowls. It is also wise to treat the seed with a 2 per cent. solution of bluestone, similarly to wheat and oats.

Maize sowers are now fitted to sow broom seed; and, in clean sandy soils, the hand Planet Jr. seed sower answers well.

— Cultivation. —

The land should be fallowed and well worked through the winter to kill the weeds and to get the land in good order. Firming the land with a roller before drilling is a good system. As soon as the young plants are 4 to 6 ins. high the whole field should be harrowed. If slightly on the thick side, an extra harrowing can be given, always working across the drills. Until the crop is 6 or 7 feet high, it will be necessary to use a Planet Jr. horse hoe between the rows to keep down the weeds and to keep the soil loose on the surface.

Where irrigation is practised, two applications of water should suffice; one when the crop is about 12ins. high, and another just after the last hoeing.

— Sheds. —

Sheds for drying can be built of bush timber; provided the roof is watertight, any material will suffice. Plenty of ventilation is an essential, especially under the eaves and gable ends so as to allow the moist air every opportunity of escaping freely. Doors at each end, and sides that can be easily opened up, will be found advantageous, so that the air can be admitted from whichever side the wind is coming.

The quicker the curing process, the better the sample of fibre, so far as colour is concerned. The green colour is fixed by fast dry-

ing, whereas a slow process admits of bleaching, which is not desirable.

The floors of the shed can be from 2 to 4ft. apart, one above the other. The former distance economizes the space where shed room is not abundant. The 4-ft. height, however, admits of easier working.

— Harvesting. —

A crop planted the first week in November will generally be ready to harvest in March and April. The stage at which fibre is cut is important. It should commence directly the seed begins to harden, as it is advisable to have the green colour kept in the fibre. This gives it a greater value. When cut at this stage, the stalks will also be more useful as fodder for stock. In many cases, harvesting is extended over two and sometimes three months, but the colour of the fibre is bound to suffer if the crop is allowed to become over-ripe. As a slight compensation, the seed, however, will develop to a greater extent under such circumstances.

There are several methods of harvesting. The most popular, especially where the stalks are required for fodder or silage, is to break down all the stalks to the ground in every fifth row, lapping them on one another the whole length of the row. During the process, the heads are cut off from 4 to 6ins. below the junction of the panicles with the main stalk. This operation is performed with a heavy butcher's knife.

The 6in. lengths are left on the short heads and the 4-in. lengths on the long. Any sheaths attached to the stalk must be rubbed off, and the heads kept straight in the hand with the butts all one way until a handful is gathered. These are then laid across the stalks on the ground in such a way that the panicles are kept clean of dirt, and the air allowed to circulate freely throughout to dry any surplus moisture as fast as possible.

The standing rows are bent over and the tops cut off in the same way and laid on the broken-down row.

It is found more expeditious for each cutter to take two rows at a time; it will require five quick men to cut an acre in one day. If the crop has been sown thickly it will take longer, as three small heads must be handled as against an equivalent weight in one large head; the sample will also be inferior. Very small heads and bad heads are better not cut at all, as they will not pay to handle and are also liable to damage the market value of the whole.

Once cut, the fibre should not be left in the field more than one day. If rain is feared, the fibre should be taken straight to the curing shed where it should be laid on floors of saplings, battens, or wire-netting to dry. The layers of fibre should not be more than 3ins. in depth and the air should be allowed free circulation from underneath. In conveying the broom to the shed, the use of large baskets will effect a great saving of time in loading and unloading. In dry weather, the fibre will cure or dry out in six or seven days; it can then be bulked with the heads all one way, and the floor used for a fresh supply. In wet weather, it may be necessary to put log fires under the floors to assist in drying out, but this is rarely required.

The bulk should be examined every few days to ascertain if heating is taking place; if the temperature is rising, it should be broken down and re-spread for a day or two. If allowed to heat, the fibre will turn black, and in bad cases will rot away.

— Threshing. —

The seed is threshed by means of a roller—a drum 2ft. in length and 12ins. in diameter. This drum is studded with spikes which are screwed in 4ins. apart, spirally or diagonally. The spikes should be 3ins. in length from the surface of the drum, and the distance between the rows from 6 to 8ins. A spindle with a pulley on one end is run through the centre of the drum.

The roller should be driven by any power available, at the rate of 1,500 revolutions per minute. The draught is very light. Hand power may be used, but some motive power will be found best. Where a large quantity is dealt with double rollers are used, the machine being generally home made. A very useful single machine can be bought for £10.

The method of threshing is simple. To do the work expeditiously, four hands are required. The first gets the fibre down and passes the stalks to the second man on the roller, four to five stalks at one time. The seed ends are lightly laid by the latter on the revolving roller, and turned once. By this action practically all the seed will be taken off. Care must be taken not to thresh too severely, as damage to the brush at the end of the fibre will be caused. It is better to err on the light side, if at all.

When finished, the stalks are thrown on to a table where a third man grades the fibre and ties each sample into bundles, about 5ins. diameter, with twine, and throws them on to the floor of the shed ready for packing. All the crooked or bent broom should be kept separate, and two qualities made of the straight. The best in length and colour is made the first sample, and the shorter and slightly inferior, the second.

— Care of the Seed. —

After threshing, the seed should be dried thoroughly. If found to be heating, turn it with a shovel in order to cool it. It should then be well winnowed and bagged. If stored in a dry place, it will keep for years. A four-bushel bag of seed weighs 200 lbs. and over,

whilst poor seed will weigh 160 lbs. or less.

— Seed Selection. —

Seed selection should be carried out in the field as the crop ripens. Choose only those stalks which show healthy growth, with straight, fine, and long fibre. Before cutting, these should be allowed to ripen until the seed is hard. They should then be marked with a piece of red flannel to distinguish them from the general crop. The varieties which give the best results are—Italian, Green Missouri, and Dwarf Missouri.

— Baling. —

Though seldom done in Victoria, each sample should be baled separately. The operation is performed in a box specially made for the purpose. It has movable sides and no bottom. The inside measurements are 42ins. by 30ins., the sides being 48ins. high.

The press is placed on level ground, with wires to the number of five placed across the bottom. The fibre is then laid lengthwise in the press, keeping the butt to the outside and as level as possible. A false top, with battens nailed across the top at intervals of 3ins., is put on, battens downwards, and a lever or screw press applied. This can be put down twice or three times, refilling the box until a bale containing 250 lbs. is made. The sides are then taken away, the pressure on the lid being maintained. The wires are brought up and put through beside the battens and tied. After removing the lid the bale is rolled out. In addition to the body wires, it is wise to put a wire from end to end of the bale, if the fibre has to be sent any great distance, especially by rail. Slats are sometimes used on each edge of the bale, but the custom is rare in this State.

— Commercial Returns. —

The amount of marketable fibre taken from an acre is from 7 to 10 cwt., the value ranging from £20 to £35 per ton. Taking the yield of fibre at 7 cwt. per acre, and the average value at £25 per ton, the fibre alone is worth £8 15/-, whilst the value of the seed (3 bags per acre, at 7/- per bag) is £1 1/-, or a total of £9 16/9 per acre, without taking into consideration the value of the stalks as fodder.

If all labour is paid for, the cost of growing will be as follows :—

Ploughing twice, and harrowing, 15/-; seed (4 lbs. per acre), 8d.; sowing, 1/-; horse-hoeing (three times between rows, 6/-; harvesting, £1 10/-; curing and threshing, 10/-; baling for market, 10/-; winnowing seed (three bags at 1/), 3/-; bags, 1/6; sundries, including wire, twine, etc., 1/-; total, £3 18/2. Leaving a profit of £5 17/10 per acre.

Where the grower has his own labour and that of the members of his family, much of the foregoing expenditure would be saved, and with heavier yields than those used for an estimate the returns would be considerably enhanced. Growers on the King River reckon the net average returns at from £6 to £8 per acre.

— Fodder Value. —

Besides the utility of broom corn for manufacturing purposes, it has a high fodder value. The crop should be harvested before it is thoroughly ripe and the stalks made into silage. On analysis, the quality of the latter is equal to maize; the cattle eat it greedily and thrive upon it. The stalks are more easily harvested than maize for this purpose, and can be handled better for the chaff-cutter. The seed, which is of value for fowl food, and for pigs, contains a fair percentage of oil and flour. As its properties, however, are fattening, it is not conducive to egg-laying when fed to poultry. Horses do well on the feed for winter feed, but care must be taken to have it well cleaned and winnowed, otherwise the dust is liable to have bad effects.

— Prospects. —

As stated previously, the fibre is utilized in the manufacture of American brooms; whisks are also made. Mr. Albert Oatez, of North Melbourne, one of our largest manufacturers, to whom I am indebted for photographs of the finished articles, states that the market for whisks is a growing one, and that he is compelled to import fine textured fibre for their manufacture. He has, however, obtained for the purpose, some locally-grown fibre of which he thinks highly. He is of opinion that the growing of fine fibre would pay, as the price per ton would be considerably higher, ranging to £40 per ton.

In addition to our local market, there should be a fair opening for broom fibre in Tasmania and Western Australia. A sample of Victorian millet sent to England was valued at £22 per ton, and inquiries made for a supply.

Good millet will always pay and a careful grower will never fall short of a market. On any fairly-equipped farm, the crop can be grown with little expense for machinery; and, in conjunction with other farming pursuits, is worthy of a trial in suitable districts.

Killing Green Timber.

— How to Treat with Arsenic. —

The use of arsenic and caustic soda for killing green timber has attracted a good deal of attention within the last year or two, especially in the western districts of the State, where several farmers have employed the poisons with success, writes the Queensland Journal of Agriculture.

— The Auger-Hole Method. —

The Government Botanist has suggested to mix caustic soda and arsenic, in the proportians of two parts of the soda to one of arsenic, in a paste, and then, having bored a hole in the tree with an auger, fill it to about two-thirds with the paste and firmly plug it up again. The size and depth of the hole will depend on the size of the tree. If the work is done in the autumn, the retiring sap will carry the poison into the roots of the tree, which should show the effects at once, and will probably be dead in a few weeks. Success depends largely upon the thoroughness with which the work is done. For instance, some farmers last year tried to poison hollow trees in this way, with the result that the paste percolated through the dead centre, and had no effect.

— Ringbarking and Poisoning. —

The system that has recently been extensively adopted by Mr. J. E. M. Gilmour, of Gilgandra, and by Mr. J. Sawyer, of Dubbo, combines ringbarking with the poisoning.

They cut an ordinary overlapping frill while ringbarking, and pour a solution of arsenic and soda into the cut. Mr. Gilmour testifies that the foliage shows the effect of the treatment within a day or two, and that in seven weeks' time he fired a large box tree and found it burnt out splendidly.

— The Preparation. —

These gentlemen do not use caustic soda. They find ordinary washing soda as effective and much cheaper. They boil four gallons of water in a kerosene tin, and add 7lbs. of washing soda and 3½lbs. of arsenic, stirring it frequently as it boils, and then allow it to simmer quietly for an hour or two, stirring occasionally. Care must be taken to avoid getting the mixture on the hands, as it is a blood poison, and the fumes of the boiling mixture must be avoided, as they have upset one or two farmers who have inhaled them. As the mixture cools, add water to fill the tin up again, and the liquid may then be applied hot or cold. Mr. Gilmour finds an old teapot particularly suitable. About a third of a cup of the mixture is poured into the ringbark cut, and after waiting a couple of minutes he adds a little more, to make sure. The "ringing" must be fresh. An old cut is of no use at all. Gloves should be used as a protection for the hands.

— Effects on Soil and Stock. —

Mr. Gilmour's experience is that soft, sappy timbers take the poison best, but it is harder to get it into tougher timber, and possibly the auger hole would be worth trying in such cases. The secret of the method is thoroughness, for slumming will prove itself very soon in a crop of suckers, which means further work. No anxiety need be entertained about the effect of the arsenic on the soil, for the quantity used is infinitesimal, and as for stock, Mr. Gilmour testifies that he had some horses in a small paddock during the work and a large number of sheep immediately afterwards, without any injurious results. However, Mr. F. B. Guthrie, Chemist of N.S.W. Department, recommends that stock be kept off the land for three or four weeks, when there would be no danger.

The ringbarking should be done as near the ground as possible, and the axe should cut through the bark into the timber a little, in order to make sure that the poison does not escape between the bark and the wood.

Utilizing Straw.

There are good indications that straw will, in the near future, take a prominent position as a stock fodder. Some highly interesting experiments have been lately made, with the view of modifying the nature of the cellulose in straw, so as to improve its value as a stock fodder. In 1899 Keller made some important experiments in this direction. He employed a special method of disintegration, analogous to that employed in paper making. He submitted rye straw, under pressure, to a solution of caustic soda, carbonate of sulphur, and hyposulphate of soda. The result was satisfactory, the product showing a digestible value equal to that of starch. The nutritive value of the straw thus treated he found was from eight to nine times that of straw in its natural condition.

The results obtained by Kellner induced Professor Lechmann, of Goettingen, to undertake a series of experiments on a large scale, with a view to proving the practical value of the process. He submitted chaffed straw to a solution of three per cent. of caustic soda, under a pressure of five atmospheres, and heated the mixtures for six hours. The product obtained was slightly alkaline, but this might be remedied by heating for a longer period. The cattle took the fodder thus prepared readily, and did not suffer the least inconvenience. The practical results speak well for the new fodder. Two lots of sheep were penned. One was fed on 3lbs. of clover per day, while the other received 2¼ lbs. of the treated straw and 4½ ozs. cotton seed meal. Both lots did equally well. The result of this experiment excited a deal of notice in some parts of Germany, and already some of the best sugar making plants are being utilised in the preparation of straw fodder after Professor Lehmann's process.—Exchange.

Lucerne for Dry Districts.

Stock owners in dry districts are constantly endeavouring to devise means by which the natural pastures can be improved in order to increase their carrying capacity. There is, perhaps, no more profitable and surer way to do this than to convert some of the grazing or cultivation areas into lucerne paddocks. Sowing imported and indigenous grasses, or top-dressing with fertilizer the grazing areas, has, in dry districts, never met with such a degree of success as lucerne-growing.

How easily lucerne adapts itself to fairly dry climatic conditions is constantly brought under notice by the ever-increasing areas being put under lucerne in the dry areas of the southern and south-western parts of the State. Many thousands of acres in these districts, generally considered only fit for wheat growing, will, if thoroughly prepared, give a satisfactory return in average seasons when sown with lucerne.

— Preparation of the Soil. —

The land should be ploughed in autumn or early winter the year before it is intended to sow the seed. Plough nine inches deep, provided the top soil reaches down to that depth. In case the top soil is only five to six inches deep, then the land should be ploughed to that depth; and a second plough, with the mould-board taken off, should follow the first plough, and stir the subsoil to a further depth of six inches. Care must be taken not to bring any of the subsoil to the surface.

The ploughed land should then be allowed to lie on the rough state during winter, and be broken down in the beginning of spring with harrows. During the summer months, the land must be frequently worked with harrows, or cultivator, so as to allow neither growth of weeds nor the formation of a hard crust on top. If the seed-bed cannot be worked down sufficiently fine with the harrows, a one-way disc cultivator or roller will soon do all that is necessary. If the land is rolled, it should be harrowed immediately after the rolling.

The success of lucerne growing in dry districts depends almost entirely upon the thorough preparation of the soil, and the ideal conditions to be aimed at are a deeply ploughed soil, in which the previous year's rainfall has been conserved, together with a finely worked surface as a seed bed.

— Method of Sowing. —

Lucerne can be sown in the southern or south-western districts either in autumn or in spring. The farmer must use his own discretion in this respect. Should late summer rains have fallen, and the soil be in a condition to ensure an immediate germination, an autumn sowing should be made.

From 10lbs. to 12lbs. of seed per acre will be found to be a sufficient quantity if evenly applied. Broad-casting by hand is not recommended, as the seed cannot be so evenly sown as when a drill is used. If, however, it is necessary to broadcast the seed, it should be mixed with treble its bulk of sand, asnes, or fine soil.

It is advisable to apply, at time of sowing seed, from 70lbs. to 80lbs. of superphosphate per acre. This will ensure a good start for the young plants, and encourage them to develop a good root system.

One of the best methods of sowing the seed is to mix thoroughly 70lbs. of superphosphate with 12 lbs. of lucerne seed; put the mixture into the manure box of an ordinary seed drill, and set the drill to sow about 80lbs. of manure per acre. The discs or hoes of the drill should not be set into the soil too deeply. Some drills, especially when new, cannot be set to a shallower depth than 1½ to 2 inches; in such a case a good plan to follow is not to set the lever of the drill into the first notch, but to let it dangle. The cogs of the drill will be in gear, but the hoes will not go down as deeply as if the lever had been set into the first notch. In this way the seed will be sown about ¾-inch deep.

Special care must be taken not to fill the manure box right up. Not more than sufficient seed and manure for one acre, i.e., about 80 lbs., should be put into the drill at one time, and this should be stirred up occasionally to prevent the seeds rising to the top of the manure.

In order that the seed may be thoroughly covered, it is advisable to either improvise a brush harrow at the back of the drill, or to harrow after sowing with light poppy harrows.

— Treatment of Paddock after Sowing. —

Barley grass, trefoil, or other foreign seeds, germinating with the lucerne seed, are frequently a menace to the young plants. If such should be the case, the mower should be run over the paddock before the foreign grasses run to seed. As the cutting thus obtained is a very light one, and of little value, it is advisable not to

gather, but to leave it to act as a mulch to the young lucerne crop.

In average seasons two cuttings will be obtained from the paddocks, besides providing excellent pastures for topping off sheep or lambs for market.

The sheep should never be allowed long enough in the paddock to eat too deeply into the crown, and thus destroy the plant. After each feeding-off, the paddock should be thoroughly harrowed in both directions with heavy harrows.

If, after a few years, the lucerne shows signs of going off, a top-dressing will be found beneficial. To do this, a mxture of about 80lbs. of superphosphate and 20lbs. of sulphate of potash should be applied with the drill. The tubes leading into the hoes of the drill should be taken off, as otherwise the manure will be sown in rows 7 to 8 inches apart. If sown, however, without the tubes, the manure will be evenly broadcasted. A heavy harrowing must follow the top-dressing.—Agricultural Gazette of N.S.W.

Cowpeas.

These are, as a matter of fact, beans, not peas, and belong to the same family of plants that provide us with lima, haricot, and other garden beans. We have experimented during the past seven years with a large number of varieties to arrive at some definite data in selecting those most likely to provide us with a suitable fodder during the heat of summer. The value of the cowpea as a fodder is augmented through its known properties in restoring fertility. We are realising its value now in the rotation of farm crops. It flourishes at a period when other crops are useless as a soil renovator, and is thus particularly useful in warm climates. It is now known that during its period of growth it possesses the special function of gathering nitrogen from the atmosphere, and thus increases the sum of available plant food in the soil. When turned in, the plant provides humus, so essential in dry soils, not only for increasing its organic contents, but also to increase the moisture-holding capacity of a soil. Among the leguminous crops, cowpeas stand very prominent during our summer months, in providing succulent fodder as well as nourishing the soil. Cowpeas thrive on light sandy soils, where other plants would starve. In the rotation, it may follow cereals, and when eaten off with sheep or pigs will give a return providing a good profit on the cost of seed and cultivation, with the additional advantage of leaving the soil in good condition to be followed by an exhaustive crop. The crop may be eaten off by stock, converted into hay, or preserved as ensilage; being a highly nitrogenous food it ranks with lucerne, bran, and clover in the production of red flesh and the solids in milk. The mode of culture is to give the soil thorough tillage, getting the surface into a fine condition. Plant the cowpeas in drills 3 feet apart, with the seeds 6 to 8 inches from each other. Use 7lb. to 10lb. of seed per acre, according to the variety. We use an ordinary maize drill, fitted with a plate having ⅜-inch holes. After planting, when the peas just appear above the ground, a scuffle should be sent along the drills once a fortnight to keep the soil clean and loose. This is necessary until the vines grow too dense.

Where the soil is deficient in lime, it will be advisable to use about half ton of gypsum to the acre three months prior to the final cultivation. A dressing of superphosphate, at the rate of 1½ to 3 cwt. per acre, is useful.—N.S.W. Gazette.

Improvement of Dairy Herds.

Results at Hawkesbury Agricultural College.

The value of herd-testing is illustrated in the records of the 1911 milk yields for the Hawkesbury Agricultural College dairy herd, which are now available. The herd has been steadily improved since 1898 by the use of imported pure-bred bulls, or of bulls descended from imported stock. In this way it has been graded up until it has reached a highly satisfactory standard, especially when it is recollected that fifteen years ago the herd was only yielding an average of about 3,000lbs. of milk per cow per annum, and when also the class of country is taken into account.

— High Averages. —

The records of the milk and butter yield from each cow during one period of lactation in 1911 shows that the herd of sixty-three cows averaged 5,395lbs. of milk per head, and 251.2lbs. of butter. Taking the value of the butter as 10d. per lb., the average value of the butter produced was £10 9/4 per cow.

The first three cows on the list produced respectively, butter worth £19 5/6, £15 17/1, and £14 18/2, or an average of £16 10/3. The last three on the list gave, respectively, £5 3/8, £4 8/8, and £4 6/2.—an indication that even in a good herd there are those that fall a good way below the average. The produce of the first few cows, in weight, was as follows :—Jersey-Kerry-Jersey—9,364 milk, 462 lbs. butter ; Kerry-Jersey—7,896 lbs. milk, 380 lbs. butter ; Shorthorn Jersey—7,360 lbs. milk, 345 lbs. butter ; Holstein—7,911 lbs. milk, 333 lbs. butter ; Ayrshire—7,552lbs. milk, 327lbs. butter.

— Butter Breeds that do Well. —

This is a good average for such a numerous herd, especially as it contains a large percentage of heifers on their first calves. The value of butter breeds like the Jersey and Kerry, on light land such as that forming the greater part of the College lands, is demonstrated by the fact that the first ten include four animals of the Kerry-Jersey cross. The milk is weighed night and morning at the College, and is tested for butter fat at regular periods, the records being carefully kept and furnishing interesting comparisons with the yields of years ago. Most of the animals now milked have been bred on the farm, and the averages show a vast improvement on past records.

The Starling

By Walter W. Froggatt, F.I.S., in the Agricultural Gazette of N.S.W.

Various European birds were introduced into Australia many years ago, when the Englishman, in sentimental mood, wished to see the birds of his boyhood days about him; and some well meaning but misguided persons introduced the sparrows, blackbirds, and most of the song birds. Among these birds was the common starling. It landed somewhere on the shores of Hobson's Bay, and soon made its way into the city and suburbs of Melbourne, where it was firmly established over thirty years ago. There may have been a special importation from England, but I think that the ancestors of the Sydney starlings were brought from Victoria.

In the days when acclimatisation was in the air, Australian birds were not considered in any way interesting. Even as far back as 1843, Assistant Surgeon Bartlett ("New Holland, 1843") wrote :—

At night no more he hears the delightful warblings of the queen of songsters—the charming nightingale. The hoarse croaking of the offensive bull frog, and the incessant buzzing of the hideous mosquito, he takes in exchange for the gladdening tones of England's fairy songsters.

Mr. R. H. Horn voiced this un-Australian feeling in "Australian Facts and Prospects," published in 1859, wherein he bewails the fact that the ugly gum-trees spoilt the beautiful park-like land near Melbourne, and says "if they could all be cleared away, and replaced with oaks, elms, etc., the landscape would be greatly improved."

The starling was known in old England as the "stare" or "starred," starling being the modern name of this bird. The members of the starling family belong to the genus Sturnus, of which the common starling (Sturnus vulgaris) is a typical form, breeding throughout the greater part of temperate Europe.

It is one of the most adaptive of what we might call domestic birds, and not only has it extended its range across Asia to Japan, but it has travelled downward, over the Mediterranean, to the southern parts of Africa, while it has also found its way to the Canary Islands, the Azores and Madeira.

Artificially it has been introduced into Tasmania and New Zealand, as well as Australia, and wherever it comes it remains a settled resident.

The common starling is not found in North America, but its place is taken by a closely allied form that was once known under the scientific name of Sturnus Proeditorius, and has many popular names which denote its destructive habits, such as the "Corn-thief" or "Rice Bird," though another popular name, the "Red-winged Blackbird," defines it much better. This is the Bob-o'-Link of the popular natural history books of the United States which, as the Rice Bird, plays such havoc with the rice and grain fields of the south in summer, migrating in millions to South America at the approach of winter.

We have one native representative of the family, the Glossy Starling (Calornis calybeius), which ranges from south-eastern Asia through New Guinea into Northern Australia. Its coat is jet black, with an intense metallic green gloss that gives it a very distinctive character.

—The Starling in Great Britain.—

In olden days in England, the starling was looked upon as a friendly domestic bird that did much good and comparatively little harm. In Knight's "Encyclopaedia of Natural History," published in 1856, the editor says :—

Common starling or stare, one of the handsomest of our birds, and a general favourite. It is intelligent, sprightly, and has a retentive memory, and when kept in confinement the male learns to whistle tunes and imitate the human voice.

In Marris' "British Birds," there is no mention of the starling doing any serious damage to fruit or crops, though it is stated, when noting its food, that it includes grain, fruit, and seeds.

Theodore Wood, in his "Farmers' Friends and Foes," 1888, in reference to the starling, says :—

Save that it is a little too fond of ripe cherries, indeed, and will sometimes make free with a little fruit of other kinds as well, I know of no accusation that can justly be brought against it, and this fruit is a very trifling price to pay for the services of the bird in the way of insect destruction. The starling, in fact, is one of the greatest of the farmer's friends, the counterbalancing mischief which occasionally mars its services being in most cases so small as scarcely to be worthy of mention.

However, in the last work dealing with the starling in England, "Harmsworth's Natural History," 1911, we find that conditions at the present time, for some reason or other, are quite altered. The authors say :—

The starling is one of the most adaptive of birds, in consequence of which its range is steadily increasing, especially in the British Isles, in which its numbers have augmented of late years to an extraordinary extent.

Noting its insectivorous qualities, they go on to say :—

At the same time account should be taken of the heavy loss which fruitgrowers sustain from the inroad of hordes of hungry starlings, the extraordinary numbers of these birds which visit orchards of ripe fruit almost defying

description. Recently the starling has developed a special fondness for ripe pears and apples, and does not altogether disdain wild fruit, even the berries of the rowan or mountain ash being much to its taste. When feeding on grass lands, in company with thrushes, the starling is apt to play the part of a bully, robbing gentler neighbours of their fairly earned subsistence.

— The Starling's Voice. —

The starling is remarkable for its wonderful flow of bird language, and though the usual note when feeding on the lawn, or foraging in the fowl yard, is a somewhat harsh chuckle, they cultivate a great variety of notes. Hall and Gillies, in their "Nature Studies in Victoria," describe them well as follows :—

One bird called plaintively as if in trouble. The call of another suggested the not unpleasant sound of a good violinist tuning his instrument. In a third call we heard the slight crack of a child's whip, and in still another the harsher sound of a boy's rattle. Then we were startled to hear a spirited imitation of the blue wren's notes. But the leading note, the note most characteristic of the starling, was one which suggested the breath drawn in with a musical sound.

Dr. Bowdler Sharp, in the "Royal Natural History," tells how the starling mimics other birds. He says :—

We have heard individual starlings reproduce the call note of the skylark, goldfinch, wagtail, and other small birds. Sometimes we have been startled on a winter's day to recognise the cry of the common sandpiper, or the grating call-note of a fern owl, in the middle of a crowded city, and have discovered the author of our astonishment in the person of a starling that is pouring forth his rhapsodies from some neighbouring chimney.

It was, and perhaps may still be, a common practice on the Continent to keep the starling as a talking cage bird. Years ago it was a cruel custom to sear their eyes with a red hot wire, under the impression that blinded birds always talked best.

Readers will remember the pathetic chapter on the starling, in Lawrence Sterne's "Sentimental Journey in France, where he says :—

On my return through the passage I heard the same words repeated twice over, and looking up, I saw it was a starling hung in a little cage. "I can't get out, I can't get out," said the starling. The bird flew to the place where I was attempting his deliverance, and thrusting his head through the trellis, pressed his breast against it as if impatient. "I fear, poor creature," said I, "I cannot set thee at liberty." "No," said the starling, "I can't get out ; I can't get out."

Pliny says that two Caesars, Germanicus and Drusifus, had a stare and sundry nightingales taught to speak Greek and Latin. "Moreover, they would study on their lessons, and meditate all day long, and from day to day, come out with new words—yea, and were able to continue a long speech and discourse."

The question of the value or otherwise of the starling from an economic standpoint is such a vexed one that it is well worth considering, and the writer proposes to place both sides of the question before the readers of these notes.

— A Domestic Pest. —

In the suburbs of our large cities, and some of our country towns, the starling has become such a domestic bird, that it often tumbles down the chimney and startles the inmates of the house. It is domestic, or rather too familiar in its nesting arrangements, for it carries a mass of sticks, grass, and other material into the roofs of houses, wherever it can find an opening large enough to sqeeze through; consequently, where starlings are numerous, as in the neighbourhood of Melbourne and Sydney, they soon form large accumulations of these nesting materials. These heaps then become infested with a minute semi-transparent mite, which lives upon the birds themselves ; and under favourable conditions the mites increase in such numbers that they often spread throughout the house, and getting into the beds and clothes of the occupants, cause a great deal of annoyance and pain by biting and sucking blood. From its minute size and colourless body (until it has sucked some blood), this mite is very difficult to detect, and it is not an uncommon thing in Sydney for a doctor to be called in to examine the suspicious red rash caused on delicate skins by the objectionable starling mite.

The only way to cleanse the house thus infected is to get rid of all the rubbish in the roof, close up all openings through which the birds can enter the eaves, and thoroughly disinfect the whole place.

In the suburbs they also, with their friends the sparrows, eat a lot of food and scraps in the fowl yard, and thus are, to a certain extent, depredators on the poultry keeper.

— An Orchard Pest. —

It is in orchards, however, that they do so much damage ; but around Sydney they have not become such notable pests as in Victoria, probably because the class of fruit grown in the area around Sydney consists chiefly of apples and citrus fruits. It is also a well-known fact that they have hitherto been more numerous, and were established at a much earlier date in Victoria than in New South Wales.

Within the last few years there has been a very marked increase in their numbers about Sydney, and they are spreading in all directions into the country districts, either for good or for ill in the so that they will be a great factor near future.

Admitting that the starling does destroy insect pests in Australia, as it is still credited with doing in Europe in the winter months—it is not of much advantage to the orchardist if the starlings destroy his fruit crops in the summer, for as a general thing the insect pests would have left him something.

The Dutch Naturalist, Dr. J. Ritzema Bos, in his "Agricultural Zoology," says :—

Very serviceable. Devours, especially in autumn, many field snails ; also cockchafer grubs, wire

worms, grass caterpillars, grasshoppers, leaf life, and many insects destructive to fruit trees. The starling, however, is able to do considerable damage to garden fruit, since it eats cherries, currants, and sometimes even peas.

Last year it was reported in the British agricultural papers that the starlings were more numerous in the eastern counties than they have ever been in modern history. Millions of starlings and thousands of birds of other species have ruined many wheat crops. Here also there is no advantage to the farmer, if the starling eats both pests and his crop.

Prior to 1904, the starling, with other introduced birds, had been protected in Victoria, but owing to the reports of the increase of these birds in the suburban areas, and their spread into the fruit orchards beyond, the Minister of Agriculture (Mr. Swinburne) sent a circular round to the various councils, fruit-growers, and horticultural associations, asking for their advice as to whether they considered the starling a pest or otherwise. This led to a large amount of correspondence, in which all the people interested in fruit were emphatic in their condemnation of the starling. Several pointed out that while the starling was insectivorous during the winter months, it was a most destructive pest in fruit orchards, not only eating up all the smaller fruits, but pecking holes in the larger fruits, and spoiling them for market. In such districts as Doncaster, Somerville, Pakenham, Ringwood, and Yarra Glen, they were said to eat nearly every kind of fruit in the orchards, and cherries had to be watched from the time they first began to colour until they were ready to market. A few associations in Gippsland and other farming districts claimed that the starlings were their best friends, and killed many insects, particularly caterpillars, cutworms, and grasshoppers.

Mr. C. French, jun., writing upon fruit-eating birds in the Victorian Journal of Agriculture, 1905, gives a brief account of the starling. He says :—

There can be no doubt about the starling being a most pernicious enemy to the fruitgrower and viticulturalist in this State. The starlings are increasing a thousand times faster than their natural food ; hence they must avail themselves of such as is obtainable.

From the evidence placed before him, the Minister offered to place £500 on the Estimates to aid in the destruction of the starlings, if the Councils would pay half the bonus of 6d. per dozen for starlings' heads ; but difficulties cropped up, and this form of bonus was dropped. The Victorian fruitgrowers in starling-infested areas are just as positive at the present time that the starling, as far as they are concerned, is one of their most serious foes.

In the March number of the Agricultural Gazette of Tasmania are published the results of the discussion raised at the meetings of the country Boards of Agriculture, "Should starlings be protected ?" We find that eight of the associations declared that the starling was more beneficial than otherwise, and several Boards reported in favour of their being protected. Colonel Legge, hon. secretary of the Agricultural Board of St. Mary's, went so far as to say that starling were purely insectivorous; that they had acquired the habit of eating fruit in Tasmania, and also the objectionable habit of nesting in the chimney-spouts and roofs, because they had been liberated in the towns and not in the country. Such statements are certainly not borne out by the investigations of their habits at the present time in England. In one report—that of the Tamar Farmers and Fruitgrowers' Association—the starling was recorded doing much harm by attacking fruit and sprouting grain ; but this was qualified by the following statement :—

But they rendered yeoman service in other ways, as grub exterminators, being especially helpful in mitigating the grass grub pest.

This is a remarkable example of the same bird under different conditions developing different habits, for while a bonus is being paid for starlings' heads in Victoria, just across the Straits in Tasmania the farmers are advising their protection.

— The Starling and the Sheep Maggot Fly. —

Within the last few years the increase in the starling population of our towns has led to a striking migration of these birds in large flocks from the town into the country. In the southern and south-western districts these flocks have been observed among the sheep on the plains and have been seen upon their backs picking off the ticks. This is a common habit in Europe. Retzema Bos, previously quoted, says :—

Starlings often settle on the backs of sheep and cows to pick off the vermin.

It has been noticed also in Victoria. The secretary of the Casterton Pastoral and Agricultural Society, writing in 1904 to Mr. French, said :—

Nor is the damage confined to fruit trees, but in flocks of sheep, they alight on thr sheep's back, and hurt the evenness of the wool to a great extent. It has been noticed that so terrified are the sheep when a flight of starlings approach that they run away as though rounded up by dogs.

This new migration into the farming and pastoral districts of this State has brought the starlings very prominently before the public, and a great many letters from residents in the country

have been published in the newspapers, leading to further comment. Farmers have claimed that they were destroying the sheep-maggot flies, and have extolled the starlings as the solution of this serious insect pest. Thus far, little actual evidence has been brought forward to substantiate these general statements; though on the southern tablelands it is claimed by some landholders that they are an effective check upon the sheep-maggot fly, that for the last few years has been doing so much damage to the sheep and wool industry.

From an extended study of blow-flies and their maggots, in conjunction with careful observations upon the habits of the starlings, I am very doubtful whether these birds make any appreciable difference in the numbers of blow-flies and their maggots. Starlings, when hunting for insects and such animal food, find it upon the ground. Caterpillars, cut worms, beetle grubs, grasshoppers, and other ground-haunting insects are their natural food, together with seeds and fruits when obtainable. They do not catch flies, which even when resting on the ground are too alert to allow a bird like the starling to catch them. The more or less clumsy starling is not built like a fly catcher, and would have considerable difficulty in snapping up a fly if it were resting on a sheep's back.

It is therefore only in the immature or maggot stage of these destructive flies' existence that we can count on the assistance of the starling. They will certainly pick up any exposed maggot dropping from the sheep on the ground; but the maggots that hatch from the eggs deposited on the surface of the fleece are soon out of reach. These tiny maggots, too small when first hatched to be gathered into the starling's stout beak, waste no time, but work their way through the fibre of the wool right down to the skin, and are under the protection (in a full fleeced sheep) of the close wool before they are any size. Therefore, to obtain a supply of maggots of a reasonable size for food for a bird as large as a starling, the bird would have to delve into the wool for a considerable distance, or else tear out the wool above them. Now, as far as I have personally observed their actions, and from everything I have read, the starling does not fossick into the wool, but simply picks things off the surface.

So far there has been no positive proof given by anyone that the starling, when he becomes a bushman, destroys sheep maggot or other allied species of flies. The only way to obtain reliable evidence of its value or otherwise as an insectivorous bird in this particular line, would be to shoot half a dozen birds during their feeding hours among the sheep and cattle (we know quite well what they find in the gardens and back yards). These birds, or their stomachs, the latter for preference, could be placed in a 5 per cent. solution of formalin in small bottles, and forwarded to the Entomological Laboratory, where their contents could be tabulated.

— The Future of the Starling. —

The most important question arising from the migration of the swarms of starlings into our bush lands is what the effect will be upon our many useful native insectivorous birds that, in spite of indiscriminate poisoning of rabbits and other dangers attendant on the advent of civilisation, still carry on their work in orchard, field, and forest. We have shown the wonderful adaptive power of the virile starling to invade new lands and multiply under all kinds of climatic conditions. It may happen that the invaders may become the sole feathered occupants of our bush lands, and the greater portion of our wonderful native bird fauna may be banished from the face of Australia. Hordes of hungry starlings competing for the food supplies, often circumscribed in winter months and times of drought, will soon clear up the local insects, seeds, and berries of our bush, and all native birds with similar food habits will have to go hungry, and finally give way to the aggressive intruders. Then, again, they will dispossess our birds of their nesting places; and, not counting our smaller birds, even the laughing jackass, magpie, shrike, etc., will run short of suitable nesting grounds. It is also stated on good authority that starlings do not turn up their beaks at the eggs of any other birds when they find them unprotected; and that they turn birds out of their nests to occupy them, if suitable in size and location.

In conclusion, it is not what the starling is doing at the present time that is open to question, but what he may do in the future, even allowing that he is only a pest in some districts, and that in others he pays for the damage he does to the fruit orchards by policing the gardens and fields. Given a free hand, a virile, adaptive, aggressive bird of this type, with no natural enemies, living in a land of almost perpetual summer like the greater part of Australia, where there is no necessity for an annual migration with its attendant dangers, there is no restriction on an excessive increase in their numbers. Where will they stop? When all the insects are gone, they will not starve, with the wheat fields and cultivation paddocks at their mercy; and, as has been shown in Victoria, when once they acquire the habit of fruit eating, these omnivorous birds do not trouble about insects. It may be the same with the wheat, and it will not surprise anyone who has given the matter close attention if the migration of the starling into the country does not in the near future mean another very serious and far-reaching pest to the great wheat fields of Australia.

There is certainly no reason to extend any protection to the starling by Act of Parliament. If he proves himself a destroyer to the sheep-maggot flies, the sheep owners will see to his protection far better than law can do the work.

Influenza in Horses.

The first symptoms may develop in from one to three days from the time the horse has been exposed to the infection. The symptoms persist in one form or another throughout the attack which, in cases which recover, will run its course in from six to ten days. Of course, at the end of this period the horse will be in a much weakened state, and unfit to resume work until convalescence is complete. The disease is of a febrile type, and, as mentioned above, its onset is very rapid and marked by extreme prostration and dejection. In a simple case there is high fever, the head hangs low, the eyelids are swollen, there is an effusion of tears, and the eyes are sensitive, making swallowing very difficult. The appetite is impaired; the patient may take a small mouthful occasionally, but will not complete the mastication; and the thirst is great. The urine is high-colored and scanty, staling of small quantities at frequent intervals. The faeces are also scanty, a few small balls covered with mucus being passed. The patient is indisposed to move, and, if made to do so, staggers and sways with weakness. The sore throat is mostly accompanied by a cough, and may also be associated with an external swelling or fulness of the throat. The internal temperature is usually increased. It may run from 101 deg. F. to 106 deg. F., a rise of from 2½ to 5½ deg. above normal. A temperature above 103 deg. F. is indicative of the thorough establishment of the complaint, and the necessity for rest and appropriate treatment.

In an ordinary case the pulse may not be greatly disturbed, and any considerable increase from the normal (40 beats per minute), say to 60, 30, or 100 beats should be taken as premonitory of definite inflammation of some internal organ. The breathing is quickened, particularly in those cases which tends to develop pneumonia. The inside of the eyelids and the eyeball are abnormally reddened, and, in cases with liver complications, may present a yellowish tinge.

The previously mentioned disinclination to move would appear to indicate in the light of one's personal sensations during an influenza attack, the presence of severe aching pains in the muscles. This is especially suggested when an attempt is made to turn the patient round; the head, neck and body are allowed to partly swing round before the limbs are moved, and as much space as possible as taken to turn in. Forcibly turning the patient in a short space distresses him considerably, and is generally productive of a prolonged grunt or groan.

These are the most commonly manifested symptoms in an ordinary, benign case. In those in which complications occur, symptoms are presented which are specially indicative of the disease which is developed.

— Complication and Sequelae. —

The most serious aspect of influenza is its liability to complications, and what may appear to be a severe cold may develop into a serious attack of inflammation of the lungs, intestines or joints. In those cases where inflammation of the lungs (pneumonia) supervenes, death often takes place with startling suddenness. A horse that had been seen apparently well a few hours previously may be found dead. The pneumonia is frequently double, that is, both lungs are involved. The difficulty of breathing is very pronounced.

In the intestinal form of the disease, in addition to the primary symptoms, there is slight colic and uneasiness. The state of constipation will be succeeded by diarrhoea, the faeces being watery and escaping from a constantly open fundament, with much straining to evacuate, Death may ensue by the third or fourth day. In a small percentage of cases, inflammation of the feet follows on the premonitory symptoms, and the horse becomes "foundered."

Other troubles may supervene. There may be the development of abscesses about the throat, joints, or internally. Rheumatism of muscles and joints, with accompanying lameness, is of frequent occurrence, and swellings on head and limbs are common. Recovery, however, takes places in the majority of cases if care and attention are given, the disease running its course in from six to ten days.

— Nursing and Medical Treatment. —

The prime essential is rest. The medical man orders the influenza patient to bed immediately, and warns him against attempting to battle the disease out while performing his ordinary work. So with horses: few of the cases will develop into anything serious if the patients are relieved of work immediately.

During an attack of horse influenza good nursing is of supreme importance. Unless steps are taken to insure the patient's comfort, the giving of medicine will be futile. He should, therefore, be placed in a roomy, well ventilated, but warm box, with plenty of bedding, and should be well clothed and bandaged. Plenty of pure water to drink, frequently offered in a clean bucket, is desirable. A teaspoonful of saltpetre or of chlorate of potash may be dissolved in each half-bucket of water. Green stuff, if available, should be presented in an appetising manner. Gruel, milk with eggs beaten up, linseed or hay tea, boiled oats or barley—in fact, anything that will tempt the patient to eat—should be offered. Only small quantities of food should be offered at a time, and any food that is not immediately eaten should be taken away. Nothing nauseates a horse quicker than allowing stale or mouthed food to remain

in front of him when he has no desire for it.

As a homely and readily available remedy, three ounces of whisky four times a day, with one drachm of quinine in it twice a day, may be given. An ounce of sweet spirit of nitra may be substituted for the whisky. When convalescent, one drachm of extract of gentian may be substituted for the quinine. In a simple case, inhalations of hot water vapours (steam), into which a little eucalyptus oil has been introduced, is good. A stimulating liniment applied to the throat will be serviceable. In cases where there is difficulty in swallowing, medicine in the liquid form should not be given. In such cases, portion of the drench is apt to pass down the windpipe, in which case grave lung complications will follow. Instead, an ammonia ball (as prescribed below) should be given twice a day; or an electuary, consisting of belladonna extract and chlorate of potash., two drachms of each with a sufficiency of treacle, should be smeared on the teeth three times a day.

In the lung cases, liniment or mustard paste may be applied to the sides of the chest. The constipation may be relieved with injections of warm soapsuds. Purgative medicine should not be given, one peculiarity of influenza being the extreme irritability of the lining membrane o, the bowels, and the consequent intense response to purgative or even laxative medicine, whereby violent purgation and inflammation of the bowels may be readily induced.

In the intestinal form of the disease the constipation will be succeeded by diarrhoea, when the linseed tea will be useful. A solution of gum may be added to the drinking water, and laudanum given in ounce doses twice a day. Where the attendant can administer a ball, perhaps the best medicinal treatment throughout the attack is to administer twice or three times daily a ball composed of ammonia carbonate, gentian and ginger, of each two drachms.—Victorian "Journal of Agriculture."

Alleged Milk Tainting.

Complaints that milk raised from lucerne paddocks is tainted and fails to produce sound keeping butter, are described by Mr. H. W. Potts, principal of the Hawkesbury Agricultural College, as untenable, since the introduction of pasteurisation (the old milk "scalding" system) and it is only a question of time and technical education to demonstrate the immense undeveloped resources placed at our disposal throughout the irrigated areas. There is a season, too, for the feeding of concentrated foods, such as copra and linseed cake. The former stands out as an excellent fodder in dry seasons for rearing young stock, maintaining the milk flow, and especially suitable for cows when suffering from diabetic troubles as a result of depleted pasture. The production of linseed as a by-product of flax growing will provide the dairy farmers with another useful and nutritious cattle food. With the adoption of pasteurisation the problem can be readily faced of feeding the cattle on a variety of prohibited fodder, such as root crops, kale, cabbage, artichokes, potatoes and such like. The prevailing weakness in our dairy system, speaking generally, cannot be ignored. Take the average supplier. A glance at the homestead displays the inadequate provision made for feeding. A haphazard reliance seems ever present in the shape of unlimited confidence in natural pasturage. When this fails, as it must of necessity do, then bad times are bewailed.

To avoid this loss, and to attain the most profitable result, the farmer should possess a reasonable knowledge of the ration fed to his cow, and its possible effects. If the food be properly proportioned, it must contain defined quantities of milk and muscle forming material, which the chemist calls protein. But should the carbohydrates predominate, or exceed the ration previously mentioned, then fat will accumulate in the body, and a low quality of milk and butter fat will be the result. There is no more useful field than that of the extension of technical education to the dairy farmers in relation to the principles underlying the feeding of dairy stock in order to secure the greatest returns from a minimum quantity of food. The margin of profit emphasises the urgency for reducing the cost in production.

To feed well and economically is the point to be aimed at. To feed a cow with more than she absolutely requires to produce a given quantity of milk is simply waste. Nutritive ratio is the term now used to describe the exact proportions in which these two leading elements are economically presented in cattle food. The kind of food is practically immaterial so long as the proportionate amounts are utilised and balanced in a palatable and digestible form. Moreover, food, no matter how given, must be in a healthy, sweet and relishable condition. Damaged food such as musty chaff and mouldy bran has a bad effect not only on the digestive capacity of the cow, but also on the quality of the milk. The evidence to be obtained by an inspection of the operations of all the most successful dairy farmers gives the most convincing conclusions that generous and intelligent feeding pays, and no high returns are shown except where the feeding from the pasturage is supplemented by other sound fodders. The supply of food for a profitable dairy farm must be constant and sufficient.

A Giant Oat.

There is growing in Lancashire on Garton's seed grounds at Warrington (says the London "Daily Mail") a single oat plant which surpasses by several hundred points any cereal ever produced in the world. The single head contains a few short of 1000 grains, 10 times as many as you will find in the best crops. The plant is a more or less accidental result of the original system of what may be called accelerated evolution, which has been practised on these grounds for the last 27 years. This particular prodigy has been obtained by crossing highly developed oats with the wild oat, which has an incalculable capacity for bearing seeds. These are small and useless, but the strange fact has been discovered that the wild oat may in crossing even enlarge the grain of the cross, as well as increase the number. This particular oat is but an extreme instance of the new productions in cereals of all sorts, it is an indisputable fact, though practical farmers will have difficulty in believing it, that on these grounds oat crops of 160 bushels to the acre—that is twice the weight of a high average of present crops—have been reaped without any artificial manure or any intensive cultivation. It may be years before the most prolific of these grains come into commerce; but a juncture has been reached when a great part of the world has suddenly come to see that England is the greatest plant-breeding country in the world, even greater in plant-breeding than animal breeding. Especially in Denmark and the Unites States have these scientific results at Warrington caused a sensation, and this pitch certainly has been reached, that each country can get from England just what it requires a large ear, or short straw, or loose husk, or tight and is now being supplied.

THE PREDOMINANT PARTENER

The agitator: "I have here, my friend, a leaflet giving seven reasons why you should come out on strike—"

The other: "Look 'ere, old mate, I've got ONE reason why I don't come aht— an' there she is! You go an' argue with 'ER!"

On a Small Farm in the Hills.

By "Think of It."

There are never really slack times on the above, but at this time of the year there is as a rule a little time that can be devoted to the fences and cow and sheep yards. Nine out of ten farms have small yards and eight of the nine yards are made with old rails, etc., which need replacing, and assuming that the orchard and garden have been ploughed and dug, and the prunings all cleared up, it would be time well spent in getting new rails, etc., for these yards and then when busier times come, one can yard his cows or sheep without the fear of having to chase them around the paddock after yarding them; it is very annoying to get a young heifer in to milk and in chasing her round to get her in the bail for the first time (a thing which should never be done, although it is) she bumps against an old rail and breaks it and both she and calf make for the farthest corner of the paddock, and probably an hour elapses before she is yarded again. This not only makes one (whose time is precious) wish he had a strong yard, but it also upsets the young cow and makes her timid when at last she is bailed and milked. Cows have a good memory and it never fails them in a case like this.

The same is to be said of the sheep yard: most small farmers keep a few ration sheep and in the warmer weather kill just before dusk. Now if after driving a mowing machine all day you milk the cows and then turn attention to the sheep, which have probably been yarded by the son, who has not long been home from school, or the boy you keep (if you are not blessed with a son at school) to do the odd jobs and running about, they make a rush, when you go into the yard, knife in hand, and go through some weak place in the yard, and you miss catching the last one through the hole it makes you feel like selling the sheep and patronising the butcher, who comes round your way once or twice a week. In the wet weather, and between showers, it may save a lot of tropical language, etc., later on, if these are just given an eye (of course there may be plenty else to do, but why make more to do in the busy time by omitting this now?) Besides, a nice strong and neat yard adds to the appearance of a place. It is an easy matter on most places in the hills to go out in the paddock and cut a few round gum rails fairly straight, and they will last for several years.

Never use wire netting for a sheep yard, as the sheep do not see it when they become frightened, and rush into it; if it is not exceptionally strong then the whole side of the yard is knocked down, and if it does stand the impact the sheep is bruised, and a bruise on a sheep shows more after the pelt is off than before, I can assure you. I saw a gate recently with three bars in it 18 inches apart and wire netting tacked on it, this was on a sheep yard and when the man went to catch a sheep, some of the others had an idea they could go between 18-inch bars, and they did. Some people are not blessed with rails on their farms, especially the people on the plains, and of course they cannot make these improvements, but those who can will perhaps save themselves a lot of trouble when the cows come in.

A Warning.

The destruction wrought by the bushfires in January last, should prove sufficient warning to those who have much rubbish about their places. As one travels about he sees in many places people are cutting their hedges back fairly well, especially where a hedge has been allowed to grow very high, evidently with a view to hiding some building or other. I notice several of them are being cut back to about 8 or 9 feet high; this will not only guard against risk of fire, to a certain extent, but will also improve the hedge; as everyone must know that a hedge that is allowed to grow high and never trimmed will become, in the course of a few years, very thin at the bottom.

A hedge is worth looking after and it would be a shame to see some of them burnt. I am not saying that cutting it back will be a sure guard against fire, but it must to a certain extent lessen the danger. To get them to grow thick, cut with a hook of some description (not a saw) as leaving them roughly cut on top (but level) tends to thicken the hedge below as the sprouts will shoot out better.

Publications Received.

— Potash on the Farms. —

This is the title of a very useful booklet of 64 pages, written by Messrs. J. M. Hattrick, F.H.A.S., N.D.A., and G. F. Kibblewhite, and published by the Agricultural offices of the Potash Syndicate. It deals with the use of potash for farm crops, cereal, root, etc., and is largely based on the results of practical field experiments conducted in part on Government experiment farms, agricultural colleges, and high schools, but for the greater part of leading agriculturists on their own farms. The booklet is illustrated by photographs of comparative results of various experiments, which serve to increase the favorable impression, which the very complete figures, which are quoted, create in favor of potassic manures as an important factor in the production of crops.

The authors are, we believe, conservative in their estimate of the value of this manure; in any case, they strongly emphasise the equal importance of other elements of fertility and of good and thorough cultivation. They recognise the impossibility of fixing a standard of quantities to be used which will meet all cases and conditions, but fair average application is suggested in the case of crops treated of and farmers are strongly urged to experiment for themselves. We have not space to quote individual experiments, but the following is a sample, and a particularly favorable one, of the gains to be made by adopting a system of complete manuring. It is the result of an experiment carried out by Mr. W. Sharpe, on a dark loamy soil at Wamberal, N.S.W. :—

Plot 1.—With no manure, yielded 1,500 lbs. of cabbages. Plot 2—with 1 cwt. sulphate of ammonia and 2 cwt. superphosphate, yielded 35,000 lbs., whilst the addition of 1 cwt. muriate of potash to the foregoing dressing increased the return to 78,000 lbs. In this test, which the authors state is a common result, the nett profit due to potash at 3/- per dozen was no less than £72 19/- per acre, a marvellous return for fifteen shillings worth of manure.

A brief summary of twenty-four experiments with potatoes indicates that the increase in crop obtained from plots manured with potash, phosphoric acid, and nitrogen, as against plots receiving phosphoric acid and nitrogen only, ranged from three quarters of a ton for half hundred weight sulphate of potash to as high as 3½ tons for 1 cwt. sulphate of potash.

We should mention that the various forms of potash are discussed, and their special suitability for varying conditions.

We strongly advise our readers interested in the subject to send to 7 Bridge Street, Sydney, N.S.W., for a copy.

We have received from the Government Statist a copy of the report on the Statistics of Vineyards, Orchards, and Gardens and Root Crops for 1911-1912. Fruitgrowers and others will find in it much that is interesting and instructive. The figures deal with the last five years, and satisfactory increase is noted in almost every item treated of.

We have received from Mr. F. W. Maiden, of Botanic Garden, Sydney, a copy of part 5, Vol. 2, of his Critical Revision of the Genus Eucalyptus. The subjects treated of in this part are Eucalyptus Olcosa, with varieties Longicarnis and Glauca. Eucalyptus Gillii, named after Mr. Walter Gill, of S. Australia, from whom Mr. Maiden originally received specimens. Mr. Gill mentions that the only local name that he could pick up was "curly" Mallee, Eucalyptus Falcata, and variety Ecostata. In each case Mr. Maiden supplies concise descriptive notes with symonyms, range of distribution, and other particulars of interest.

Perhaps no hostelry in the city is better known or enjoys a more popular reputation throughout the country districts than the Imperial Hotel, situated at the corner of Grenfell and King William Street, now under the supervisiin of Mr. S. Flannagan, late of the Hamburg Hotel. The Imperial has always been regarded as a most comfortable house, but the new and genial host (Mr. Flannagan) is having very extensive and superior additions made, whereby the hotel will be practically refitted throughout, as it is his intention to make it one of the most up-to-date and convenient in South Australia. To the visitor the Imperial is a veritable "home from home." Mr. Flannagan's friends are by no means confined to Gawler and Port Pirie, where he was previously engaged in the same line of business, but are to be found North and South, East and West, in all parts of the State, as he had the happy knack of making his guests feel at ease, and visitors so treated, we need hardly say, have rarely any desire to go elsewhere. The situation of the Imperial is unexcelled, being convenient for the railway station as well as for engagements of business or pleasure. Ben Johnson when he said, "Let me take mine ease in my inn" desired no higher stand of comfort than this, and we feel sure that will be the experience of all who decide to put up at the Imperial.

A traveller was obliged to patromise a man who had only a rickety old craft to carry passengers across the bay.

"Say, cap'n, has anyone ever been lost in this boat? It seems very unsafe."

"Well, not as I know of," the boatman answered.

Then the old boatman added: "There was four drowned from her last week, but we found 'em all next mornin' at high tide."

Over-Run in Butter.

Mr. A. Jenson, an American dairy authority, speaking on the above subject, says :—

In this progressive world the relation of production to cost is an ever important question, and so we find it in the work of butter making. One creamery will have 10 per cent, over-run and another will have 25 per cent., and both may be working under nearly the same condition. As over-run is only the extra ingredients found in butter other than butter fat, but being part of the finished product, and the butter fat being the basis of first cost, the economical relation between butter and butter-fat necessarily becomes a greater factor in determining the success of a creamery. Up to within a few years, very limited knowledge was at hand as to how to control over-run in butter, but the question presented itself how to obtain more money from a given quantity of butter fat in the shape of finished butter. Busy brains set to work looking into the composition of butter, with the result that a great range of ingredients other than butter fat was found. Further work established the fact that the over-run is largely controlled mechanically, and can be increased and decreased and the question of quality also plays an important part, as with the increase of artificial over-run there will be a noted decrease in the quality. I now wish to name a few of the principal factors that affect over-run. Ripe cream churns better, and leaves less butter fat in the butter milk than partly ripe cream, thereby affecting over-run. Large granules retain more moisture than small ones. A full churning will show larger water content in the butter than a small one, although the same method is used. Warm wash water causes the butter to retain more, moisture than ordinary cold water, through affecting the body of the butter. Heavy cream shows a larger yield than thin cream, although made under apparently the same conditions. The amount of working of butter affects the yield also, and it is possible to increase or decrease the percentage of water by manipulation of the churn. These being some of the effects on yield, and all being controllable, it is clearly seen that the question of yield is primarily mechanical; still I would not attempt to describe how to obtain a specified over-run, unless I were absolutely familiar with all conditions; but I can state positively that regularity in all details, from the first handling of the raw material to the finishing of the work, is absolutely essential in the control of over-run.

Country for Horses.

As to what soils or class of counrty are best suited for growing hoof, no rule can be laid down; but on soft, swampy land the hoof is apt to grow soft. The sponginess of the ground generally allows of the sinking of the foot to the coronets, and sometimes to the feltock joints. Though this causes expansion and width, good firm country allows of even wear and tear, and at the same time develops in the pastern that slope which is essential to free extensive action in a horse with a wellset shoulder for the collar. Nature does much to adapt the hoof to the circumstances of the horse's environments, creating an almost perfect shoe of the hardest horn imaginable among horses born and reared on the stoniest table lands. One has only to examine the feet of horses that come from the region of Central Australia to see a practical demonstration of this effect. On the other hand, some of the worst shaped feet can be found upon horses hailing from sand-hill country.

Plant Food.

An American authority, Professor Roberts, says :—

"The vast store of plant food is the farmer's stock in trade, the bank upon which he may draw. Its value can never be accurately determined, since a part of the plant food is not available, and since the power of the plant to secure that which is available depends upon many conditions, such as the correct preparation of the land, the kind of crops raised, the relative amounts of the various required constituents, and the amount of moisture present. Those farmers who are most expert in their methods in recent years have come to the conclusion that increased production on good land is more cheaply secured by superior tillage than by the purchase of large quantities of fertilizers."

To raise a good crop of vegetables, every farmer knows that the garden must be put in good tilth. A piece of ground, no matter how rich, if left lumpy, hard, or with a very loose surface soil, or poorly ploughed, will not make a suitable garden. The surface soil wants to be in more or less loose condition, but not so loose that the water from the subsoil cannot pass up through it to the roots of the plants. An inch or two of extremely loose soil is a good thing, for it serves as a mulch, and prevents the water from evaporating but it is not well to have it in such condition to the bottom of the furrow slice.

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Poultry Notes

The Crate-Fed Chicken Industry.

The fattening of poultry, even for house use, is very little practised in South Australia, yet there is no doubt that for home purposes a reasonably fattened fowl is much more satisfactory than one picked up out of the run without preparation, while a few pence per head spent in this way would make a very great difference in the returns received for table poultry sold in the city auction rooms. There are, of course, many methods, each of which has its special suitability for the conditions under which it is employed. The following notes on the subject from the Reliable Poultry Journal, will probably prove helpful to any of our readers who may wish to add some weight and much improved quality to the next pair of fowls they may use for table purposes: The crates can, of course, be of the most simple description, and can be raised on slatted floors or be left without bottom and moved to fresh ground from day to day. Quickness and semi-darkness plus heavy feeding on suitable mashes cover all there is about this class of fattening.

The general run of range-fed chickens can be fatted for three weeks profitably. They are placed in the fattening crates in a lean condition, have a vigorous constitution and a good hearty appetite and develop into high-class roasters. The chickens that are reared in confinement and liberally fed from birth are in moderate flesh when placed in the crates; they have not the same rugged constitution and hence will not feed as long as the hardy range-feds. They should be removed from the crates and slaughtered when they refuse their food, which will frequently be at the end of the second week.

It is difficult to alter the color of the flesh of chickens that are fatted in the crates for only two weeks; to change yellow flesh to white color three weeks' crate-feeding is generally requirrd.

— Killing the Lice Before Fattening. —

The chickens should be thoroughly dusted with lice powder or sulphur either before or immediately after placing them in the feeding crates. By dusting each fowl over a box or paper the powder can be well rubbed among the quills of the feathers and the excess will not be wasted. It is very important and should not be neglected, for the reason that the constant irritation and loss of blood due to the presence of parasites will materially reduce the profits from the crate-feeding.

The time the chickens are in the crates can be divided into three for convenience—the first, second, and third weeks.

— Care and Feeding During the First Week. —

When the chickens are placed in the fattening crates they are subjected to very different conditions to those under which they were formerly kept. They are not allowed to roam over the fields and secure vegetable and animal life, nor fed whole grain and permitted to exercise. It is therefore imperative that they be fed sparingly the first week they are in crates. If the chickens are overfed at this time it is not possible to continue the feeding beyond the second week with profit. They should not be fed for several hours after they are placed in the crates in order to accustom them to the confinement. A small quantity of the fattening mash should be spread along the troughs and as this is eaten, more mash should be added, but not as much as the chickens would consume. The mash should be fed three times per day. After feeding, the troughs should be cleaned and turned over. The chickens should receive fresh water twice per day and grit two or three times during the week. Any of the prepared grits can be fed the chickens, or broken stone, or sifted hard coal ashes.

— The Second Week. —

The second week is the flesh maker. The chickens should be fed liberally twice per day, and the hours of feeding should be divided as equally as possible; that is, when the morning mash is fed at 7 a.m., the evening meal should be about 7 p.m. During the winter months artificial light is frequently required at the time of feeding. The chickens feed practically as well by lamplight as by daylight. The feeding trough should be cleaned and turned over one-half hour after feeding. Water and grit are supplied as in the first week.

— The Third Week. —

The third week is the finishing period. In order to improve the quality of the flesh it is advisable to add a quantity of tallow to the mashes. The special object in view is to increase the globules of fat throughout the flesh, and to obtain thereby a greater juiciness when it is served. The proper quantity of tallow is one pound per day for every 70 chickens. Towards the latter parts of the week the weight of tallow should be increased so that one pound is fed to every 50 chickens. The tallow can be melted and while hot thickened with dry meal; this paste is mixed with the mash. The tallow can also be cut up and fed in the troughs as a separate meal. The chickens should receive two heavy feeds of mash per day, and also water and grit.

Where it is not profitable to continue the feeding for three weeks, the tallow should be added to the food given the second week.

— Starving is Necessary Before Slaughtering. —

When the chickens are plucked at the home plant they should be thoroughly dusted with lice powder before they are starved. This prevents the presence of vermin at the time of plucking. A 12 to 24 hours' starving is necessary in order that the chickens retain an attractive appearance after kill-

(Continued on page 234).

Notes in Passing.

In our July number of this paper under the heading, "Notes in Passing," we published some strong comments on the attitude of the Minister for Agriculture towards the Poultry and Kennel Club and upon the Government Poultry Expert, Mr. D. F. Laurie. On consideration we admit that in our controversial zeal we made comments and statements with regard to Mr. Laurie which were unjustifiable, and we, therefore, withdraw them. In justice to ourselves we would add that portions of the article were based on what we then thought was reliable information. The contrary, however, is the case and we have expressed our regret to Mr. Laurie that the comments and statements referred to have been made.

THE ROYAL SHOW.

Good quality was, in the opinion of the judges, conspicuously present at the recent show, though numbers showed a considerable decrease on last year's total. This deficit was largely accounted for by lapsing of the farmers' classes which the Government appear to have dropped like the proverbial hot potato. Even if we grant that last year's affair was badly stage-managed the idea had sufficient to recommend it, to suggest that its continuance would have been advisable. We have seen it in print, as one of the reasons why the Government dropped it, that a number of non-qualified competitors were amongst the prize winners. Surely a sufficiently puerile reason. We have no doubt that any experienced committeeman would have been perfectly willing to knock up a schedule and set of rules, which would have obviated any difficulty in this direction. If there was failure to do so last year, no one can take exception to the action of those who stepped in to pick up some easy money. Another and more pleasing reason for the shortage of numbers is to be found in the fact that prominent breeders, especially in the general utility bird classes, such as Messrs. Wimble, Manuel, Bennett, Oliver, Cope, and the manager of Sargenfri Poultry Yards—have had an unusually good selling season, both as regards country and interstate business. An acceptable sign this that the recent monopoly of interest in the White Leghorn is coming to an end. It was not, we believe, altogether a good thing for the poultry industry.

A DISAPPOINTMENT.

Writing of shows reminds us that when it was announced that the Minister of Agriculture would not fulfil his advertised engagement to open the Maclaren Vale Show owing to pressure of political work, we felt some disappointment, for we, with others, had hoped for a definite pronouncement of a policy to be adopted towards those who have found work and interest in preserving breed characteristics in the various races of poultry. After turning down the P. & K. Club in the matter of the subsidy, the Minister's attitude towards one of its off-shoots was a matter of speculative interest. It did occur to us that pressure of Parliamentary duties might upon occasion afford convenient cover, or, diplomatically speaking, that the Minister's action might be described as a strategical movement to the rear, but, lest a worse thing befall us, we hasten to apologise for placing, even for a moment, so improper a construction upon what was, of course, a coincidence, curious perhaps, but then most coincidences may be so described.

A SILVER LINING.

Every cloud, we are told, has a silver lining. Sometimes, fortunately the lining is bigger than the cloud. Anyway, Mr. Bice, who took Mr. Pascoe's place at Maclaren Vale, being uninspired, or, should we say, unhampered by any shreds of departmental policy, was able to bless the industry in general, and the society in particular, with a whole-heartedness which was as creditable to his understanding as it was pleasing to his auditors. Some years ago we had the pleasure of a long conversation with Mr. Bice on poultry matters, and we have not ceased to regret that a kindly fortune has not ordained that he should be Ministerial head of an industry, which is not without importance to the State. Another bit of lining, perhaps, was that Mr. Duncan, responding for the judges and other well tried poultrymen, were able to express their opinion as to the tendency of Government work in the poultry world without their controversial zeal leading them into danger of hurting anyone's feelings, or, metaphorically speaking, landing themselves between the "devil and the deep blue sea."

A SOP.

We have read the published conditions for the next laying competition. We began with interest, and ended with disappointment. Probably we were not alone in

hoping that something useful would be attempted in addition to the purely competitive element. Not only has this not been done, but the present Section 3 has been dropped, also like a hot potato or at least with what may be fairly described as undue haste. In the next competition sections 1 and 2 remain as before, while section 3 is to be eligible only for those who are pastoralists, farmers, orchardists, or market gardeners. This is probably a sop thrown to those who hoped for better things, and a pretty pappy sop it is, just the sort, in fact, we should expect under the present conditions of competition management. Assuming that competitions, as at present conducted, are run for the purpose of discovering what breeders from year to year have the best laying birds as a guide to other breeders in purchasing stock or eggs—and it would be difficult to suggest any other value—it does not appear to be of any practical importance whether the birds are owned and similar stock sold by a pastoralist or a pawn broker. What the general public want to know—as far as they want to know anything—is: Who has the best and most profitable stock, and the occupation of the owner can hardly be considered of any consequence. We, in this State, should have passed the A B C of competition work. We do not know who is really responsible—whether minister or expert—but we do know that the competition conditions appear to us to afford signal evidence of incapacity.

A MISFIT.

It is not often that our fellow scribe, "Breeder," runs to humour, but the following quotation recently from his pen is probably an unconscious effort in that direction. He writes, in the course of a grumble apparently directed against the Government, because they would not allow the expert to spend what he calls a paltry two hundred pounds on single testing for private breeders at the competition:—"A little bird is persistent in its chirping that certain authorities, who broke up the poultry industry elsewhere, are on the same warpath here. The bird says that you can judge a man's intellect by his attitude towards poultry breeding, and this bird is quite right." As probably nine out of ten readers would consider that the cap—ill made as it is—is intended for Professor Lowrie's wear (no other candidate being visible on the horizon) it is a little interesting to consider whether it is a reasonably good fit. Facts proclaim that the little bird to whose fanciful twitterings breeder has been listening is very wide of the mark.

A few years ago West Australia imported over £70,000 worth of eggs. Recently it came down to £40,000. Rather a solid answer to the wrecking idea (anyway, we should like to be similarly wrecked) and a plain demonstration that the cap is a farcical misfit. If our own industry had increased at the same rate as that of W.A. our export of eggs would have increased by scores of thousands of pounds more than has, we believe, been the case. So in the friendliest spirit we suggest that "Breeder" should screw the neck of that very inaccurate and misleading little birdling. He would also be well advised to get the idea of the importance of official countenance out of his head. It merely scratches the surface of things.

ON DOCTORING FOWLS.

Many people pride themselves on the successful doctoring of their sick fowls. Is it worth while to waste time over remedies which may effect a cure of some particular disease, but which leaves a bird in no condition to afterwards breed from? This is what "Farm and Home" says about it:—"Don't make the mistake of doctoring sick chicks. Most always you will fail to cure; you will waste time that could be better employed on the well birds; and, even if you succeed, the weakness will always be there. In the general run of things, you will breed from one of these cured birds later on, and then you will find the particular weakness considerably intensified. The dactoring habit grows. It is a fearsome thing, and the man who gets it bad is apt to become a pest to his family. He soon begins to think that Jacky is not 'looking quite the thing,' and so poor Jacky gets a dose of something or other put under his little waistcoat. Writer has seen (and dodged with great speed and earnestness) some of these doctoring chaps. From every point of view, the proper way to deal with sick chickens is to kill them out of hand."

BOTANY EGG FOOD.

The question of meat feeding and the giving of stimulating spices to poultry are questions which have been very much discussed by breeders. There is no doubt that the weight of evidence is in favor of the practice. The question then arises as to the best form in which it can be given. Fresh meat and bone is probably the best, as long as it is perfectly fresh, but the difficulty of providing this, and the labor of preparing it, especially during the summer months, can only be appreciated by those who have had to do it. It is just here that the manufacturer comes in, and by the preparation of a dry, inodorous, long keeping meat meal they have immensely benefited the individual poultry man. Such is the Botany Egg Producer, a food which is rich in the protein and mineral elements which are such an important a portion of poultry foods. The manufacturers state that just sufficient spice is added to stimulate appetite, but not enough to bring about any of the detrimental results which are generally ascribed to heavy feeding with these substances. The Botany egg food is very largely used throughout Australia—it is an Australian production, is cheap and has behind it the recommendations of many large breeders of repute. If you are not already using it, we suggest that it will pay you to procure a sample bag, either from your local storekeeper or the Adelaide agents (Messrs. King & Co., Waymouth Street, Adelaide).

AN ENTERPRISING BREEDER.

In renewing his advertisement Mr. P. C. Manuel is good enough to say that the greater part of his business has come to him through this paper. We are glad to have done our part in the distribution of the very excellent stock which Mr. Manuel has been putting out from the "Koonoowarra" Yards. Mr. Manuel is still almost a beginner, but he very quickly grasped that there was only one quality worth handling, and that the best. Money did not stand in the way of getting his breeding pens together, with the result that his work in poultry has been pleasant and profitable to himself and eminently satisfactory to those who have dealt with him. The list of winnings by birds from these yards at the principal shows of the year, is a lengthy one, and, as his breeding pens have been well mated and in excellent condition, the chickens he is turning out in large numbers are likely to do him equal credit in future. Mr. Manuel is an enthusiast, and as a member of the committee of the Poultry and Kennel Club, he is, we believe, likely to do much good work for that society. He has also been largely instrumental in bringing the Plymouth Rock Club to its present position, which is certainly a creditable one for so young a society.

(Continued from page 231).

ing. The starving removes the food from the intestines and prevents decomposition. A drink of water two hours after the last meal is advisable for the thorough cleansing of the internal organs. Where the chickens are consumed within a few days, the shorter starving is satisfactory; where they are held in cold storage for stronger prices, or exported, it is necessary to starve the full period of 24 hours. The shrinkage from live weight due to the 24 hours' starving is about 6 to 8 ounces. The shrinkage is less in a moderate than cold temperature.

When the chickens are properly starved there is no necessity for their being drawn until they are prepared for cooking; there are positive reasons why the operation should not take place before that time. In order to consume the flesh of a chicken in its most palatable condition the atmosphere should not have access to any raw or exposed flesh until just previous to cooking. A drawn chicken gradually loses moisture from the day it is drawn until it is cooked. When eaten it is often dry and for no other reason than the effect of the atmosphere on the exposed internal flesh. Mold spores are present in the atmosphere. These spores will germinate rapidly in exposed flesh, but they require certain conditions to develop on outside skin. Undrawn chickens that have been starved will keep fresh for double the length of time of a drawn chicken. The intestines of a starved chicken are free from impurities—there is no necessity for their removal.

Success With Turkeys.

The manner of handling the turkey hens and little poults when the poults hatch and during the ten days that immediately follow depends considerably upon the conditions to which they are subject.

Some turkey breeders prefer to give old and young free range and throw them wholly upon their own resources. Other breeders give them full liberty to go where they like, but feed the hen and brood regularly. Still others find it best to confine the poults, or the hens, until the young turkeys are well started.

The owner of the flock that runs practically wild on a wide range and secures its food by foraging cannot do much to care for them if he would, for the female cannot always be found after they make their nests and are sometimes too wild to be approached if found.

Turkeys that are kept fairly tame and persuaded to make nests near the farm buildings can be controlled and sometimes even handled without frightening them.

A good rule is to let the turkey entirely alone at hatching time, but under certain circumstances a little assistance may be given. Sometimes it is next to impossible to arrange the nest so that a poult that has dried off and become strong quicker than his fellows may not fall out and be unable to get back. If one is hatched a few hours earlier than his fellows, he is likely to find himself in that predicament if the conditions are as suggested. Once it gets outside the nest it sets up a plaintive cry and the mother, in an endeavour to take care of it, frequently neglects the nest and a whole nestful of newly hatched poults die from exposure.

If the nest can be fixed to prevent the young getting out without the operation frightening the sitter so that she will leave the nest, or break the eggs, such loss can be prevented.

If the turkey is not wild, boards may be set on edge around the nest to confine the young ones.

Turkeys that sit in an enclosure are handled and cared for in the same manner as a sitting hen of the smaller species.

— Care of the Broody. —

The natural way for a hen to do after the hatch is complete is to take her brood into the fields, or into the brush if there is any. There she protects them from enemies and feeds them with such animal and vegetable food as she can find. The young raised in that manner are strong and healthy and when they get well started they grow rapidly. But heavy rains and periods of damp weather sometimes cause heavy losses in broods so raised and various means are taken to prevent such loss by limiting the range for a longer or shorter time after hatching. One method is to set up a fence (perhaps two feet high) of boards, or small mesh wire, to inclose an area of two or three hundred square feet, on a dry spot where no water will stand during a rainstorm. This fence will confine the poults, but will permit the hen to leave them for a few minutes, if she desires to do so. During the cool weather of early spring the board fence will protect the early hatched brood against harsh winds better than wire; but later in the season, when the sun beats hot upon the ground, wire is better because it permits a free circulation of air. These fences should be moved to a fresh location as often as is necessary to keep the ground thoroughly clean. Poults thus confined are allowed their liberty when they are strong enough to get out of the enclosure.

Another plan is to confine the turkey hen in a coop and allow the poults to run at large. The coop for this purpose should not be less than four feet long by three wide, and high enough to allow the hen

to stretch to her full height. Hens that have not been accustomed to any kind of restraint seldom can be confined in a coop successfully.

These coops must be moved daily to fresh locations and the hen must be dusted with lice-killing powder once a week to keep down the lice, which breed and increase rapidly when the turkey in unable to take a thorough dust bath.

Unless the hen is very tame she cannot be let out for an occasional run, for it is not often possible to get her to go back to the coop.

The poults grow well and appear to be strong and vigorous, but when the hen is finally set at liberty, as she must be at the end of a month or six weeks, she may lead them so hard a chase that some of them become worn out and lost.

— Feeding Little Poults. —

Little turkeys whose parents are accustomed to getting their food by foraging seldom need to be fed anything from the farmer's stores; in fact, they can seldom be found and approached.

For those to be raised under other conditions there is nothing better than stale (not moldy) bread, dampened with milk, for the first two days. After that a good quality of prepared chick food made of small and finely cracked grains is a safe and desirable ration until the poults are large enough to eat whole wheat, maize and other coarse food. Those that are in pens, or whose mothers are confined in coops, must be fed three full meals a day. Some whole maize should be provided for the hen, and fresh water should be supplied at least twice each day.

The youngsters should not be fed as soon as they are hatched and dried off. They will be healthier and grow faster if no food is supplied until they are at least two days (forty-eight hours) old. They are supplied naturally with enough nourishment to last them two or three days, and to give them more, before that is assimilated, disturbs the action of the digestive organs.

My turkey nests are either barrels or large boxes. I prefer barrels, because the turkeys seem to like them better than anything else. I get as large barrels as I can. Salt barrels are very good. Place them on their sides under some brushes or trees, and cover with brush. Fasten the barrel so it will not roll, by driving a stake on each side of it, or blocking it with stones. I put in each plenty of dried grass or soft wheat straw to make the nests. When one turkey goes to a nest nearly every other one will try to lay in the same nest. For this reason I make two nests as close together as possible. Never allow a turkey to know you are watching her when she is going to her nest, for she will not go on while she thinks she is watched.

Keep the eggs that are gathered in a cool place and turn them every few days. When the turkey becomes broody, if possible, set her just where she elects; but when this is not convenient, let her remain on that nest until she can be moved without danger of breaking her up. I was told, though I found different by experience, that a turkey would hatch more of the eggs if set on the ground; but that is a mistake. Unless care is taken to build up under the nest if the weather is very wet the eggs will sometimes spoil, or the poults will be, like incubator chicks where too much moisture is used, unable to get out of the shells.

One thing I learned quite early, that a turkey hen could not be trusted absolutely with the care of her brood. Some writers say :— "She can keep the poults dry and warm no matter how hard it rains." They say this in advocating giving the little birds to her after the first few days, to take whither she will. It is certainly true that the turkey hen can keep the wee fellows "dry and warm," but if the rain catches her and her flock a distance from home, she will lead them through the dripping grass to serious detriment. It is also true, as they assert, that a hen will not willingly go into a coop to roost at night. If she is allowed to choose her own place in the open, she will be up and off on the range with the brood at almost the first glimmer of daylight, no matter what the conditions. Dew and chill make no difference in her movements, and the poor little turks are soon at rest.

Turkeys do not always have good judgment. The mother-instinct regarding chill and dampness seems to have been left out of their composition. They are quickly alert to scent danger in the direction of enemies, but of the most subtle of all dangers—wet grass and the like—they seem to know very little. Hence we cannot trust them with the unrestricted care of their broods.

Pigeon Notes.

Fantails and their Management.

The Fantail is one of the most beautiful and attractive pigeons that grace an aviary or show bench, and one really never tires of watching its graceful movements.

My present article is intended for the benefit of young fanciers of this variety, and those anxious to take up this hobby for pleasure.

My principal breeding aviary is 20ft. long, a most convenient size, with partitions at 9ft. from either end, leaving a space of 2ft., in which I keep two barrels for food and a little cupboard nailed to the back for medicine, etc.

In each side I keep, in the breeding season, five carefully selected pairs, each pairing having its own partition. Fantails require no foster parents. These partitions are each 2ft. 6in. long, by 2ft. 3in. high, with a lightly-made lathwork door, which I keep closed when pairing the birds, and they very easily get accustomed to their quarters; then I remove the gates and they have liberty. By pairing in this way it stops nearly all fighting, and the birds always seem content with the quarters allotted to them.

From the base of each bird's tail seven or eight feathers should be cut quite close to the root — say, three-quarters of an inch, thus giving the birds a much better chance of fertilising their eggs. You hear, from time to time, great grumbling from young fanciers about their birds' eggs being always clear; if the above suggestion be carried out such grumblings will soon cease. There are, of course, exceptions (this proves the rule), as sometimes the male bird has such excessive action that it is no use for a season, and aften two seasons. Of course, I have known birds that have never fertilised their eggs, but such cases are rare.

The floor of the aviary should be covered, say, to the depth of 1½in. to 2in., with sea sand, which, after being laid down and riddled through a fine sieve, is the most healthy covering to the floor; but it is often most difficult to procure in small quantities; therefore, when impossible, I recommend coarse pine dust.

The aviary should be cleaned out every day, and fanciers using sea sand will find great advantage, as it does not take nearly so long, and the waste is far smaller than where sawdust is used.

In each partition where you have the nest bowls (each pair should have two bowls), a thin covering of sand should also be added, making it quite easy each morning to remove droppings. I use coarse sawdust in my nest bowls, and when the birds are just going to nest I cut up bits of straw and throw them on the floor, giving the birds great enjoyment in picking these up and taking them to their mates, who sit in the bowls and build the bits brought to them in a carefully-formed nest. Birds get to know you, and do not mind your walking about close to them when they are sitting.

After the eggs are hatched, about the eighth or ninth day, when putting on the ring, the nest pan should be thoroughly well cleaned out, and the young made comfortable in a new nest of sawdust. Watch each morning when the parents are feeding the young if one is a bit neglected; if so, remove the big, well-fed one for a bit, simply keeping it in your hand; then replace when the neglected one has been fed.

When the youngsters are about five weeks old, sometimes younger, they should be removed from this aviary into another aviary kept expressly for youngsters. This aviary should have no shelves—simply blocks of wood, about the size of a brick, placed on the floor (of course, the floor being covered with sea sand or sawdust), just enough apart to stop fighting. As the youngsters grow older, the cocks should be divided from the hens simply by placing a partition in the centre of this aviary. The front of this aviary should be, from the ground to 3ft. high, of wood, the remaining 4ft. small mesh wire.

The youngsters should have a bath given them every other day, which greatly helps the moulting process.

Then a few of the best forward young ones should be "penned off", and trained for the shows; I mean by trained, to behave themselves in a pen and get accustomed to it; and not as some birds you see at shows dashing themselves about and breaking their feathers. Birds that get this training are never any trouble to the judge, whereas a wild, untrained specimen often has to take a back seat through its owner's bad managament or neglect.—"Feathered World."

THEN AND NOW.

The young wife had given her husband a dance.

"You've improved wonderfully, Jack," she said as they sat down. "Don't you remember how you used to tear my dress?"

"Yes," he replied. "I wasn't buying them then."

Pigeon Pars.

Dreamers die young. Good management is what brings in the profits of pigeon keeping.

Be kind and gentle with the birds. Tame pigeons are more profitable than "scary" ones.

The pigeon raiser who is constantly complaining about "bad luck" is advertising the fact that hir methods are at fault.

Pigeons keeping is not a get-rich-quick business. It is real business requiring careful attention and patience that can wait for results.

Bad luck investigated will invariably prove to be wrong management. Good luck and proper management are very intimate acquaintances.

It is the oily nature of hemp seed that causes pigeons to crave it.

Pigeons want oil, and if the proper quantity of vegetable oil can not be supplied, they will take animal oil. This is why they keep pecking at a new beef bone with marrow and fat on it.

A person visiting the lofts but once a week, may find a pair of nice, plump, helpless squabs this week, and on returning next week would find the nest not only empty, but the squabs mingled and flying with the flock, and not easy to detect and catch by a novice.

A very useful mixture to keep in the loft, to be used in case of canker, is ten per cent carbolic acid. This can be used on either old birds or squabs, and, to use it, take a long feather, stick it in the bottle and swab the mouth out each day. The cheesy substance can be removed after the second or third application, unless in an extremely severe case.

Although the weather is cold, do not neglect a bath, where the birds have been used to it. The feathers are proof against the water reaching the body, and with dull, damp weather there is a tendency to discolor the plumage of the birds, which the bath will help to keep away.

"Practical Squab Raising," says that a cock bird is a very bashful fellow at times if there happens to be two odd hens trying to mate to him. He seems all bewildered, and does not know which to take. When eggs are laid in such cases, there are usually three or four, but the continued fights between the two hens cause the eggs to get chilled and they will not hatch. The greatest trouble in a coop is when two cock birds want the same hen, or same nest. Pigeons then are not doves, and in order that they may be peaceful nothing but mated birds should be in an established breeding coop.

In the pigeon business, "youngsters" are young pigeons between the time they are squabs and six months of age, or when they have a full coat of the second crop of feathers. During this time, their feathers at first are dull in color and appearance, then they begin to shed this first coat—very slowly, only a few feathers at a time—and bright new ones take their places. This continues until they are six months old. The last feathers to change are those on the back of the neck, the three top wing feathers and the big tail feathers at both sides.

Pigeon authorities agree that there is no comparison in the relative ages and breeding value of pigeons. Breeders from five to twelve years old seem to be more settled and domestic, and will give a larger average product of squabs than the younger ones.

There is an instinct in pigeons which causes them to be afraid of anything which kills any of their number. Therefore, never wring a pigeon's neck, nor kill squabs within view of stock birds, as it has a tendency to make them wilder or more timid of you.

All arrangements for the coming breeding season should have been made by this time, all surplus birds having been gotten rid of, and the mating well handled.

A healthy pigeon is not readily susceptible to cold or to changes in temperature. Dampness is the main thing to avoid.

A correspondent in the American Pigeon Keeper says: Don't let any breeder tell you that he can so mate his birds that they will all hold their matings when delivered to you, because they will not, and a large number of pairs will split and remate. But you have one great advantage over the man who buys unmated birds—the fact the they have been mated guarantees that the number of each sex is equal. Should unmated birds be purchased, they will be several months longer in going to work then mated working pairs.

Pigeon Notes.

By Carrier.

Since last notes appeared "Carrier" has been rather in demand.

It has been decided by the S.A.C. & P. Society to continue their young bird shows, and also to resume their monthly meetings. Both are likely to make for the betterment of our fancy.

Sales of 1912 rings have been brisk.

There has been some talk of adopting the Victorian method of stamping instead of ringing young Saddlebacks of the feathered-foot variety. My own experience proves to me that stamping is a failure, as I have found it possible for a bird to lose all the stamped feathers months before the date of the show, for which the stamp is the guarantee of age.

It is a matter of regret that a ring for feather-footed varieties seems unprocurable. An oval shaped ring rather larger than that made for Pouters and about an eighth of an inch in depth should fill the want, and since the Saddleback promises to make its mark in this State, it is a matter for the consideration of those who cater for the sale of pigeon rings.

Would it not be a good idea next year if we pigeon men were to follow the example of the Malay men and send a massed team of pigeons, making a big attack on a leading show in one of the sister States? Something of tis sort should prove of more than passing interest, bringing a return visit from lofts on the other side to our shows.

Home Notes.

Sleeping in Damp Beds.

If a statistical return could be prepared showing the number of deaths occurring in one year which are directly traceable to persons sleeping in damp beds, we fear that the total would be a startling one. There is no detail in the whole management of house keeping to which greater attention should, in our opinion, be paid than to the important question of protecting a sleeper from occupying a bed in which the sheets are not thoroughly aired. Neglect in this particular has been followed by the most serious consequences. The dampness of beds is generally in the sheets, for blankets and mattresses are not changed with every occupant, and are therefore less liable to this defect.

It appears to us that the old-fashioned test of putting a looking glass between the sheets and noting whether or not its surface is obscured by dampness is a simple and effectual method for the discovery of damp sheets. The remedy is clear—namely, to take off the sheets, where dry ones cannot be procured, and to sleep between the blankets.

Useless Girls.

Thank fortune the days of useless girls are pretty well over, but some specimens of the class, unfortunately, linger even yet. They are generally the daughters of people well enough off to have given them a comfortable home, and prevented them learning much. They come of a generation which considered a lady did not need much education, but it was a hall-mark of gentility that she should be able to strum upon a piano and daub very badly in water colours. As to making a frock or trimming a hat—the thing was impossible! To cook or dust!—only servants did those things, not ladies. Well, we haven't many of those girls nowadays, and yet some still remain. They haven't large incomes, as a rule, and they are frequently anxious to add to them, but if any suggestion is made to them on that point, they cry: "Oh, I couldn't do that! I don't want to work like a slave! I want something light and easy that pays well." These girls can afford but few gowns and can neither make nor alter them; consequently, they never look well or suitably dressed for any occasion. They get unbecoming hats, because they cannot alter a flower or a bow to make all the subtle difference a useful girl understands so well. The useless girl amuses herself all day long—or, rather, she tries to do so—for amusement, undertaken as an occupation, becomes the most wearisome thing in the world. She wastes time that busy girls would give anything to possess. She is never cheerful, happy, or contented. She makes a miserable daughter and sister, and woe betide the man who gets her for his wife!

Wanted—A Servant.

Some person who had trouble with his servants advertised for a girl. He says:—"Wanted—a girl to dwell in my family, assist my wife in doing the work, and give directions generally. Wages not much object, if she will only leave me enough of my income to pay for the crockery she breaks. If she should not be satisfied with five evenings in a week, an effort shall be made to give her eight; she may decide what she shall have to eat, and whether it shall be overdone, underdone, or done at all, and do, in fact, as she pleases, except wear my wife's gloves and shoes (unless her hands and feet are within four sizes of being too small). We always give our servants Christmas and New Year's gifts. Feather beds or mattresses, as preferred. A sick sister or old mother will be no objection, as we have a spare chamber, and will, if necessary, hire a nurse to take care of her. P.S.—A piano and music supplied free of charge. The use of the parlour for company. No account taken of the tea or sugar that enters or leaves the house.

Glove-Cleaning at Home.

A "shiny" kid glove is difficult to clean, because the polish is removed in the process of the work, and cannot be restored; but gloves of the soft-finished, undressed kid, if they are of the first quality, may be repeatedly cleaned, and only grow softer and prettier in the process. Purchase at a chemist's a pint of the nicest refined benzine. Do not attempt to get the deodorised fluid. If the gloves are properly aired, every particle of the unpleasant odour will pass away, and they will quickly take on the fragrance of violets or any perfume which lines your glove sachet. Stretch the gloves on your hands one at a time. It is a great convenience for two persons to do this work together—one putting on the gloves and the other cleaning them. A pair of wooden hands of the size of your hands is a great convenience. Have a supply of small cloths of white cotton, or, better still, of linen. Dip one of these cloths in a little of the benzine, and begin rubbing the gloves. Clean them first carefully at the tips, and wherever they are most soiled. Do not saturate the leather with benzine at any time, but apply just enough of the benzine to remove the dirt. It will require vigorous rubbing to do this. In a few minutes the cloth will be so soiled that a clean one must be used. Renew the cloth frequently as it absorbs the dirt. Rub the gloves with downward strokes from the fingers to the wrist. After a short time the gloves will be found perfectly clean, but they have now the harsh look of a "cleaned glove." Bring forward a bowl of talcum powder. Rub the gloves thoroughly with it, applying it with a flannel cloth. This powder absorbs any remnant of oil, such as is found in even the best refined benzine, and restores the soft velvety surface of the glove. After the glove has been rubbed thoroughly with the powder, clean it off with a fresh flannel, shaking the gloves well. Hang them out in the open air for a few hours where the sun cannot reach them. In a little while take them in and lay them away in your glove sachet.

Home-made Wardrobes.

Lack of cupboard room necessitates wardrobes; but, as these are expensive, the busy fingers of the housewife must often be depended upon to improvise substitutes. If there is a corner of the room with sufficient space, it may be utilized in the manner herewith described:—Two strips of wood as long as you desire, and four inches wide by one inch thick, are screwed in the angle of the wall about six feet from the floor; boards are cut off to fit in the corner and resting on these strips; this will form the roof. A brass or wooden rod is then run across the front of this board from wall to wall, from which the curtain is suspended by rings. Cretonne, chintz, or printed cotton will make a good list to choose from, and are inexpensive. One may screw upon the under side of the roof as many hooks as are required, and, if desired, a shelf may be introduced about fifteen inches below the roof, and on that attach the hooks. Such an emergency cupboard will often be found of great convenience and the cost will be found trifling. It will be well to stretch a piece of muslin or paper across the upper side of the roof to keep out the dust.

Vegetables as Medicine.

Few people know the medicinal value of vegetables. Asparagus, for instance, forms part of the cure for rheumatic patients at such health resorts as Aix-les-Baines. Sorrel is cooling to the mind as well as the blood, and forms the staple of that "soup aux herbes," which a French lady will order for herself after a long and tiring journey. Carrots, as they contain a quantity of sugar, are fattening, and are avoided by some people as indigestible. It is the yellow core of the carrot, however, that is indigestible, for the outer red layer is tender enough. In many parts of France the peasants have recourse to an infusion of carrots as a specific for jaundice. The large sweet onion is very rich in those alkaline elements which counteract the poison of rheumatic gout. If slowly stewed in weak broth and eaten with a little cayenne pepper, it is said to be an admirable article of diet for people of studious and sedentary habits. The stalks of cauliflower have a similar value, only too often they are so ill-boiled and unpalatable that they are not inviting; but when well cooked and served with proper dressing, there is nothing more enticing.

Frying as an Art.

The failure of so many cooks in frying is due to the fact that they "dry fry" everything, having no notion whatever of "wet frying." To "sauter," as the French call it, or "dry fry," is to cook food in a small quantity of hot, fat and in a shallow pan. Omelets, pancakes, liver and bacon, chopped vegetables cut small, are samples of the sort of food which may be cooked thus. Small pieces of meat and fish may also be sautes, and when done are very good, although it is open to question whether it would not be much more satisfactory if fried in a larger pan with a more generous proportion of fat. When sautes, articles should be in constant motion by jerking the pan to keep them from sticking, and they should be turned so that they may be equally cooked on both sides. To wet fry is to immerse in hot fat, and this method, of which cooks are so much afraid, constitutes real frying. The first necessity is to have enough fat to cover the food all over, so that the heat shall be conveyed to every part alike, above and below. This is not extravagant. It is, on the contrary, economical, as the fat can be used again and again. But the fat must be hot enough. A brown colour or a crisp dry surface are the marks of good frying. Fat must not boil. It must be just hot enough to contract the juices of the meat and carbonise its surface. Fat has attained this condition when it is still, and when a fume rises from the centre. Throw a piece of bread into the fat: if it browns immediately the fat is hot enough; if it remains pale the fat must heat a little longer. The smaller the article to be fried the hotter should be the fat.

The Morning Bath.

The cold or tepid sponge bath, taken in the morning before breakfast, with friction to make the skin red, is one of the most health-giving actions we know. It promotes the healthy circulation of the skin and all the organs of our body, and keeps them in a good condition and healthy in appearance. Some persons cannot indulge in a "morning tub," by reason of some peculiarity of their constitution, or from liver affections, and are unable to take the bath quite cold. It should, in this case, have just the chill taken off, but the skin should, in all instances, immediately after the bath, be thoroughly rubbed with a coarse towel.

Tried Recipes

— Chicken Mould. —

Mince the remains of a chicken have ready some boiled macaroni, butter, and line a basin with it; then take a little of the macaroni and mix with it one tablespoonful of bread-crumbs, a little grated cheese, one egg, three tablespoonfuls of milk, pepper and salt to taste. Beat well together, and steam for twenty minutes. Serve with white sauce poured over it.

— How to serve Pork Chops. —

Season four pork chops with salt and pepper, fry them over a slow fire till done. Cut two apples into slices, lay them with the pork in the pan, and fry till done. Lay the pork on a hot dish and place the apples around it.

— To use up cold meat. —

Make a batter of three tablespoonfuls of flour, half-a-pint of milk, and one egg; chop up the meat, add to it a half-boiled onion, half-a-tablespoonful of chopped parsley and salt, and stir all into the butter; grease a pie-dish, stir-in the omelet, and bake half-an-hour; turn out on a dish and serve with gravy round.

— Fish Puffs. —

Two tablespoonfuls of boiled salt fish, minced fine, and the same quantity of mashed potatoes; beat thoroughly, then add two tablespoonfuls of melted butter, half a saltspoonful of white pepper, and two well-beaten eggs. Fill buttered pans with the mixture, brush the tops with melted butter, and bake in a hot oven.

— A Delicious Supper-Dish. —

Take three large Spanish onions, boil them until tender; have ready fried a pound of sausages; arrange round a dish, placing onions in the centre; thicken a little of the onion water, boiling it in the pan in which the sausages have been fried, when it will make a nice brown gravy, which then pour over onions on dish.

— Braised Steak. —

Three or four pounds of shin of beef. Wash saucepan out with cold water, lay in meat, and cover closely for two hours before adding vegetables, shaking often to prevent burning. Add two carrots, one turnip, three onions, and some celery cut in pieces one inch long. Let all simmer together for another two hours, with pepper and salt. Make a little thickening of a tablespoonful of flour, and add to the steak, with a little burnt sugar for colouring. A little sauce improves it.

— To Cook New Potatoes. —

Place the potatoes in a bowl of cold water, and leave them for a few minutes; then rub or scrape off the skin. Place in cold water in a saucepan with some salt, and boil gently for twenty minutes, drain and dry. Put into the dish with a tiny piece of butter on each potato, and sprinkle with chopped parsley.

— Potato Soup. —

To a saucepan of cold water, salted, add, when it boils, six to twelve potatoes, according to the quantity of soup required; and when the potatoes are nearly soft, add four or six good-sized onions, and let them simmer until the whole is a puree. Have ready a clean saucepan, in which you have placed the well-beaten yolks of two fresh eggs; pass the puree through a colander on to the eggs; add a good piece of fresh butter, allow it to warm up, and serve in a tureen, with croutins of bread, fried a golden brown, on a small dish.

— Savoury Minced Mutton. —

Chop an onion finely and fry till a light brown. Mince the mutton you wish to use; free it from skin and fat; sprinkle over it some powdered sweet herbs, and mix all with the onion. Moisten the mince with a little good gravy; season it with black pepper, and dredge with flour. Put a layer of mashed potatoes at the bottom of a pie-dish, in which place the minced mutton with a thin layer of potatoes over the top, and bake for half-an-hour.

— Fish Salad. —

Free the remains of any cold fish from skin and bone, cut into small pieces, and season with pepper, salt, oil, and vinegar. Wash, dry, and tear up sufficient lettuce. Make a mayonnaise sauce by beating the yolks of two eggs with a wooden spoon, adding pepper, salt a little made mustard, and a pinch of castor-sugar, and pouring in very slowly some olive oil. When the sauce is quite thick add enough common vinegar and tarragon vinegar to give a sharp taste. If the oil is poured on the eggs quickly they will curdle. Put the fish and lettuce in alternate layers, and pour the sauce over them at the last moment.

— Treacle Tart. —

Line a pie-dish with some pastry; then put in a layer of bread-crumbs well moistened with treacle and flavoured with chopped lemonpeel; then a layer of thin pastry, next treacle, etc., and so on till the dish is full. Place a top-crust over, and bake. To serve, turn out with the bottom upwards, and sift suger over.

— Tongue Toast. —

Take some cold boiled tongue and mince it fine. Mix it with cream and the beaten yolk of an egg, and let it get thoroughly hot. Cut off the crust of some slices of bread, and toast them nicely; butter them, lay them on a hot platter, and cover each slice thickly with the tongue mixture. Serve at once.

— Buns for Tea. —

Boil a pint of sweet milk, add half a cupful of butter, and let stand to cool; stir-in half a cupful of yeast and a quart of flour; beat, and set in a warm place. When light, stir-in the yolks of six eggs and half a teacupful of sugar, also a teaspoonful of cinnamon; work in flour until stiff. Roll out, cut with a round cutter, put on baking tins, and set away in a warm place until very light. Bake in a quick oven.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide. Telephone, 1284.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

Potting and Watering Ferns.

As a rule ferns only need repotting once in two years. When established they do not like being disturbed; sometimes they may even do without repotting for three or four seasons, but about this time every one of them should be turned out of the pots, and, if everything be right, the drainage and every inch of the outer part of the ball will be one mass of fibres. If worms have been running amongst the roots, and the drainage is choked up with small particles of soil, with no roots in it, then success need not be expected if they are allowed to remain in that condition. The drainage at least, must be removed, and clean material and a clean pot substituted; but in most cases of the kind it is best to repot altogether, and in doing this all bad soil and decayed roots should be removed. This will allow the plant to be replaced in a pot about the same size as that from which it came, and I would not use any much larger, as the roots do not require much space, especially when reduced. If plants in large pots are required it is those furnished with large roots that should be transferred.

A mixture of rough loam, rough peat, and plenty of sand suits all kinds of ferns well. In potting the finest of the mixture should never be put at the bottom. It must be on top if anywhere, but very fine material should not be used. What soil requires to be put at the bottom should be placed carefully rammed down before the plant is put in, and, when space is limited between the old ball and the sides of the pot, it may be a difficult matter to get rough pieces filled in, but they should be pressed firmly down with a piece of stick, and care should be taken that no little vacancies are left. After potting, one thorough watering at the root should be given, and the soil will not become dry again for some days. By watering I, however, mean more than once filling the space left for this purpose. After the first quantity has soaked in, another should be given, and if it is thought that this may not be enough to wet all parts of the soil, more may be applied. Once the whole of the material has become thoroughly wet, the roots are sure to go on well, but if only the surface soil is wetted, growth will neither begin nor continue satisfactorily.

Ferns whose fronds have become ragged and discoloured should be cut down to the crown. Plants which are treated in this way fore they have begun to grow, and those which are repotted should be cut over when that operation is being performed. It is astonishing how much ferns may be benefited by weak doses of liquid manure given twice a week or so. Soot water and cow manure water are both good, and when these are used—especially in the case of plants which have not been repotted—the result is most satisfactory.

The Delphinium.

Delphiniums should only be planted in the deepest and richest soils. Ground that is impoverished is of no use to this class of plant. Good cultivation and transplanting into a new situation at the end of each resting season is the way to get the high-quality blooms. The annual transplanting and division tend to stimulate the root growth, upon which the future foliage and flower spikes so much depend. The method of procedure is to lift the clumps in spring, as soon as the new shoots begin to push through the earth. Use a sharp, strong pruning knife to cut away a section of the old root stock, with a nice clump of roots attached. Pot these up for a few weeks in four or five inch pots, using a nice, friable loam. Place the pots in a bush-house or frame for a week, and see that they are well attended to. Let the waterings be no more than sufficient to keep the soil nicely moist.

As soon as the growths are a few inches high, plant the new stock out in the best position you have. Shade may be necessary for the first few days. See that none of the old rotted or hollow pieces are taken with the new clump. All diseased parts should be cut clean away. The new bed should be prepared some months ahead of the planting time, and will do with a plenteous liming.

Seedling plants that are being held over through the winter must be protected from the slugs and snails at the time they are showing their first shoots, and be planted out in the way alluded to above. If you are only growing good sorts, allow no duffers to flower in their company, or you spoil your chance of getting seed good for sowing next season. But it is not a good plan to grow for seed. Remove the first spikes as soon as they fade, and mulch with some old manure to feed the next crop.

Father (reprovingly): Do you know what happens to liars when they die?
Jonny: Yes, sir; they lie still.

Open Border Notes.

Mulch the surface of beds containing small seedlings. Keep the soil moist and loose between the plants. Keep beds and paths free from weeds and rubbish.

The rose bushes must be kept clear of aphis. Syringe with Gishurst's compound or tobacco water. Sprinkle with sulphur those roses attacked by mildew. Remove as soon as noticed all shoots from the stock. Give liquid manure.

Prepare dahlia beds at the beginning of the month, and plant out the dahlia plants towards the end of the month.

Plant seed of capsicums, dahlias, French and African marigolds, balsams, svalias, hunnemannia, asters, celosias, amaranthus, nicotiana, phlox, verbena, mina-lobata, Sturt's pea.

Lilies are now running up into flower, and some of the taller kinds will need staking. Keep them all growing; let none need water.

Evergreen shrubs and creepers may still be transplanted, but will require a little more care than those planted earlier in the season. Mulch all trees and shrubs planted out this year, and see that they get a regular watering.

Delphiniums need watering, hoeing, and manuring. The slugs are very fond of the perennial larkspur, and attack the young shoots just as they appear above ground. They therefore need some protection, such as a zinc ring.

Plant grass in lawns, and dress old with sandy soil or light sprinklings of fertilizers. Keep the grass in good order by cutting with scythe or machine.

Continue striking cuttings of Geraniums and Chrysanthemums for late blooming. Mulch the latter and water when needed.

Cut back roses which have bloomed, if this is done a fresh lot will appear. Good dressing of rough cow-manure will benefit the plants and increase the size of the blooms, give water according to the weather.

Pay strict attention to Carnations in the way of watering, tying up, liquid manure, and covering over the buds when about to open. Still plant out young stock. Some spring sorts may be layered.

Take up all bulbs which are, or have turned yellow, such as Hyacinths, Ixias, Ranunculus, Sparaxis, Freesias, Narcissus, and Gladiolus.

Stake up all Delphinums which are coming into bloom, and mulch with very rough pieces of cow-manure in preference to horse, if it can be got.

Turn over heaps of garden refuse, also manure heaps. To keep the ammonia fixed sprinkle a little gypsum as the lots are brought out of the stable.

Look after paths, and keep the weeds from borders, especially the small Euphorbia, as it seeds so freely and is poisonous.

This and next month is the best time to plant out Phlox Drummondi, also Verbenas for bedding too if out of pots. It is a pity this old fashioned flower has gone out of favor, as for small beds on lawns it makes a grand display.

Where a place can be found in some sandy loam sow or plant a mass of Centauria. They make one of the best flowers for cutting purposes they also have a sweet perfume.

Salpiglossis should be grown extensively even if they do not do so well as in the hills.

Bulbs with a yellowing foliage can be lifted, and dried off in some cool, shady place. When dry, store them in shallow trays.

Gladioli bulbs should be treated in the same way. Any seed that you save of either Watsonias or gladiolus should be sown at once, so as to get the small bulbs for planting again next autumn.

Anemone bulbs, and ranunculus as well, are better kept in dry air-slaked lime. This will keep them free from vermin.

Pelargoniums that have finished flowering, and are carrying ripened shoots are in fit state for giving cuttings. Pot up in light soil, and keep in partial shade.

Watsonias that have done flowering, and are not in the way, should be left in the ground, unless they have been there long enough to make too thick a clump. Lift those you must shift as soon as they are yellowing, clean the bulbs, and store in lime.

Any fern seeds you have left should be sown this month in shallow pans, containing a very sweet, light soil. Merely dust the seed, which is very small, on the firm, moist surface, and then cover the pan or box with glass. In watering any very fine seed use a mist spray, or let the pan stand in some shallow dish containing water until the soil gets a thorough wetting.

Hoe out the weeds. This is easier written than done. Just now the garden pests are in great array. You must shift them.

Fuchsias and calceolarias that are being flowered in the bush-house must be kept constantly moist. Spraying morning and evening is necessary all through the hottest of the summer days. Pot-grown stuff should never be allowed to dry out.

Plant bouvardias now. The hotter the weather the better for the young plants. Let them have a liberal manuring and plenty of free soil. Place the young plant in a hole of rich compost, shade for a few days, and see that it does not get dry. Bouvardias transplant at this time of year quite as readily as any of the hardy annuals. If you have not manured your old plants, scrape the earth away from their stems and give them a "feed." No manure, no flowers.

Water during the sunlight if you cannot find time for the work early in the morning or after the sun has gone down. The great thing is to rake the surface after a soaking. If you do this it does not matter when you let the sprinkler run. Lawn and grass plots are best watered in the middle of the day. For roses and all the flowering shrubs a good soaking once in ten days is infinitely better than a bit of a sprinkle every other day.

All azaleas and rhododendrons must be watered freely now that they are

ery sign of seed pod off, and prune aking their new growths. Take e azaleas into shape now. Leave e rhododenrons alone. Any cutng done now will rather injure the lants.

Mulch wherever you can. A good overing of manure at this time of ear will save a lot of watering. Dig e beds first and do the manuring fterwards.

Delay no further, but set to work o get in your summer flowering lants. Amananthus, zinnias, sunowers, portulacca, dianthus, mariolds, salpiglossis, gaillardias, must ll go out at once. Asters, too, hould be looked after, as they are mong the very best of the late ummer annuals that we grow.

All the newly-planted shrubs and helter trees should be given a mulch f bush leaves or manure.

Remember to top-dress any lawns s early now as possible. Grass is rowing freely, and will soon come hrough any soil cover that you put own.

The zinnia is one of the best of our ummer and autumn flowers. It is old and showy, very free with blosom and as hardy "as a nail." You ust give the large flowered varieties lenty of room, as they grow almost s high as a dahlia. In exposed laces light stakes should be used for ying, as the stems are rather brittle. ne good thing about the zinnia is he willingness with which it comes ack into blossom after being cut. Take each flower stem off just above a set of leaves and the new growth will break within a few days. Rich soil for all the zinnias, and any amount of water is what is wanted.

To Prevent Seed Failures.

First.—A proper condition of moisture is essential in raising plants from seed. Saturating the soil is as injurious as conditions that are dry.

Secondly.—Cover the seeds with no more earth than will permit the young plant to push its way through without unduly taxing its powers. The depth, of course, will vary according to the seed and the nature of the soil. Small seeds only require covering, larger stock will take a fair coat of earth.

Instead of using a piece of glass to cover a box in which seeds have been sown, use a piece of blanket, and keep it moist for a few days. Remove same as soon as the seedlings are through the soil.

Wife: What would you do, George, f you were left a widower?" Hub: Oh, I suppose the same as you would f you were left a widow. Wife: You horrid wretch! You told me you ould never care for anybody else."

Window Boxes.

Window box work is not over popular in Australia. We get so much better results from the out-of-door garden that there is little or no disposition to put any great effort into the cultivation of plants in boxes. Still there may be some places—there are many such in and about every great city—where no space can be given for ordinary work. Then the window box or the tub garden becomes a necessity. One must have something to add a touch of beauty to the home. Even a few pots of flowers are better than nothing.

For window work have boxes made to suit the length of the openings. For windows within reach of a balcony or verandah the box can be a tight fit. Where the openings are high above the ground they will do better in being no longer than will allow an easy transfer in or out. Make them at least eight inches deep. The width can be fixed according to your fancy or to suit the sill.

The New Zealand Insurance Company provides Stock owners with special facilities for securing live stock policies with most lenient conditions, specially prepared to meet local requirements, and carrying death from fire, natural causes and accident, whilst foaling risks are made a speciality. Most farmers recognise the importance of securing themselves against that always dread possibility of fire, and many of our readers are, we know, insured in this direction with the New Zealand Insurance Co. Quite a large number, however, who regularly insure in regard to fire do not seem to adequately realise the importance of holding policies on their live stock, and, owing to this attitude, heavy losses on the farm, which might be avoided, are incurred. Up to the time such policies were issued by the New Zealand Insurance Company these losses were, of course, unavoidable but under present conditions the farmer who decides to carry such a risk on his own shoulders is small, and the peace of mind secured thereby is itself worth the outlay. Rates and particulars can be obtained from the District Agencies of the Company, which may be located by the well-known "Maori Head" agency plate, or from the manager, 112 King William Street, Adelaide. In addition to live stock, policies are issued by the Company covering the policy holder against fire and marine losses, accident, employers' indemnity, plate glass, fidelity guarantee, burglary, etc., thereby reducing the risks that need necessarily be carried by the farmer to a minumum and largely contributing to his peace of mind. In conclusion, it may be added that the claims already paid by the New Zealand Insurance Company exceed the large sum of £8,250,000.

The Cactus.

The Cactus is worthy of a larger measure of attention than it has yet received, both at the hands of the general amateur gardener and at the hands of the more scientific amateur florist, who delights in the super-excellence of individual blossoms. The Cactus in ordinary gardens under simple conditions, but in suitable situation as to sun, is, during its flowering season, an object of great beauty, and when carefully grown the individual blooms can be made attain a size, lustre, and delicate beauty surpassing anything in the floral world, orchids not excepted, and some of the night flowering cereus have blooms as an ordinary matter 12 inches across, which under special cultivation can be produced as large as 20 inches across.

The Cactus (commonly so called), is of many kinds, amongst which are the echlinocactus, mamillaria, opuntia, and phyllocactus, and the epiplylum.

All classes may be grown from seed, but this is a very tedious process, as the time from the springing of the seed to the flowering period is from three to six years, according to the class and the conditions of growth, so the ordinary gardener had better leave growing cactus from seed alone. However, to the enthusiast the production of new forms and colours in cacti, by cross fertilisation, presents a wide and interesting field, and one in which the results have often amply justified the care and time given to the matter.

The seed may be procured from the ripe fruit. In some cases a little trouble may be experienced in separating the seed from the pulp, but this may be overcome by washing the seed out in water, and drying it with blotting paper. After the seed is freed from the fruit it is well to let it dry for a time before planting.

When dry it may be planted in light sand, in an ordinary seed-pan, but it must be protected by a sheet of glass from the weather. The seed will take several weeks, and sometimes several months to germinate, and it appears that seed only slightly dried will germinate quicker than seed dried for a long period, but, on the other hand, seed slightly dried is very apt to soften and rot. The best time to plant the seed seems to be the month of March—and this corresponds with the period when the plants start a period of vigorous growth. In the life of the cactus there is an alternation of growth and cessation of growth, with the young seedling as well as the grown plant.

The easier way, however, is by obtaining cuttings. From October to March every cutting taken and planted with reasonable care will strike and grow, in almost any soil and under any conditions—in the colder months the matter is one of some doubt, but with care and attention a fair result can be relied upon. Of the cereus there is scarcely any room for choice as to a cutting, only bear in mind, the thicker the cutting the more robust and more speedily matured will the plant be. Of the opuntias a complete joint or section forms a good cutting, in the phyllocactus the best cutting is one cut across the fleshy part of the growth, rather than where the wood runs thin at the joints. In the summer months it is well to let the cutting of cereus or phyllocactus remain in a shady place for from a day to two or three days, or even longer, till the cut is thoroughly healed over and dried. This period of drying must be judged by the substance and fleshiness of the cutting—the longer they can be so left drying the better, as the rooting is found to be better, but in no case should they be left so long as to let any withering or drying of the cutting set in, though even if such withering does set in, it will not mean loss of the cutting, but merely a longer period before it will start into growth. Cuttings left for many weeks, till quite leathery, can be grown, and will strike and form good plants. A slip that is yellow with age and incipient rot cannot be struck; though a slip so tinted by the sun, and otherwise sound, will form a good cutting. In the winter months it is essential that the cutting should be properly and thoroughly healed across a cut, even if the cuttings have to be dried till they become leathery. If this is not carefully done the cuttings below the ground will rot away to ground level—the cutting above ground level can, however, be treated as a fresh cutting, and may be induced to strike, though when the rot has once started, it seems to get into the system of the cutting, which may, however, be cut back again and again, and the cut dried, then it may be replanted each time with a fair hope of success in the fact that the cold months will be merging into the warm ones, and striking will be easier.

In the summer any soil will do to strike cuttings in, provided it has a fair amount of sun and a fair amount of drainage, a speedy rooting will result if the soil is kept slightly moist, but not wet. In the winter, cuttings are more certain of striking if planted in well-drained pots. A number of cuttings almost touching may be struck in a larger pot, but in preference a pot that will just hold the cutting should be used: the cutting should be in the soil from 1 to 3 inches deep according to its size and substance. For potting cuttings in the cool months the best soil is one-third sharp sand (or better, brick broken to the size of a sweet pea seed), one-third spongy porous leaf mould, and one-third coarse charcoal, a few small pieces of old plaster or old lime that has been thoroughly wetted and dried in lumps—this compost has in it sufficient soil to induce root growth, is absolutely porous, and preserves the cutting from rot. After planting the cuttings in this compost they should be watered to set them, and after that very little water will be needed till the warmer weather; the soil should be kept just (not dust) dry.

The echinocactus and mamillaria are not propagated by cuttings, though the plant cut in halves horizontally will strike and grow.

On the ribs of the echinocactus miniature reproductions of the plant appear, which can be readily broken

off, and they readily take root and increase in size. The Mamillaria can be propagated by pieces of the plant broken off in much the same way though their habit of growth is somewhat different from the echinocactus.

Having produced the rooted plant, the next question is how best to bring it to perfection. First, in the open garden the best soil for all classes is a well drained one, rich with old manure, loose, and full of old building material—stones, broken bricks, and mortar; it is found that the smaller roots clasp and fix themselves on to such material, the evident reason being that when the soil is baked and dry these stones and bricks hold a certain amount of moisture; and the lime has a preservative effect on the roots which in a wet winter are liable to rot, as well as furnishing the plant with a constituent it requires for its well-being. In the open garden the best position for the plant is on a warm northern wall or fence, and for the night-blooming cereus classes, such a position cannot be beaten; however, for the phyllocactus it has its disadvantages, as the flowers in the strong sun more quickly lose their brilliant colour, and without withering are liable to become bleached in patches, and the buds opening more quickly the flowers do not attain such a size as those grown more in the shade. Thus in the open sun, though the plant is more vigorous, the flowers are less beautiful. There are, however, some classes of cacti that cannot thrive in this open sunlight, but such are the exception and not the rule. In the open garden probably the most magnificent flowers from either the cereus or the phyllocactus can be got by selecting and staking out a branch from a plant and disbudding and shading the chosen bud in the same manner as you would treat any other class of bloom for such is the object, the bud chosen should be fairly in the middle of the branch, that is, having an equal length from the tip to the bud and from the bud to the joint with the main plant. For it must be borne in mind that forcing by manure at the time of the opening of the bud has very little effect on the flower—the bud and blossom seeming to draw all its requirements from the moisture and nourishment stored in the branch itself, and this will be seen to be the case from the branch becoming, as the bloom matures, shrivelled and leathery. It will be found that a large number of buds come almost to maturity, but on the first one or two flowers opening and drawing on the supplies in the branch, these buds mostly fall off, leaving the less mature buds. Therefore it is desirable, if it is intended to have several blooms on a branch, to disbud all except, say, one bud for every eight or ten inches, leaving on a branch of say 2 feet long the two largest buds, with a foot at least between them and the two smallest. It will be remembered that in a well treated phyllocactus of the better type the blooms will easily be six inches across, and two such blooms within a space of a couple of feet are a magnificent spectacle.

For pot culture the cactus is also very well adapted, and one or two excellent blossoms of six inches diameter may be got on a nine months' old cutting of phyllocactus in a four-inch pot. The potting soil for all classes should be, say, half porous half-rotted leaves, one quarter broken building material (brick and lime plaster about the size of marbles or dice), one quarter old rotted cow manure. To this add some pieces of charcoal and some sea sand. This compost should be of such consistency that water will at once pass through it, leaving it moist but not wet or muddy. To get the highest results from cactus this porous soil and perfect drainage is necessary.

Having our cutting rooted it may be potted for its first blossoming into from a four to a six-inch pot according to the vigour of the variety. After potting they should be lightly watered at intervals until it is seen that growth is commencing, when the waterings should be more frequent, and when full growth is attained liquid cow manure should be freely applied. Vigorous growth generally takes place in the autumn, and is checked in the winter, to continue in early spring. The first indication of buds for the main crop of blooms is seen from late autumn to early spring or early summer, when the blooms are in their glory. After the blooming the plants take a period of rest and look woebegone and exhausted. During this period they should be kept just barely moist, till they show signs of revival and new growth, when water and liquid manure may again be applied as before directed—a concise rule is to water in proportion to the growth of the plant. Now to promote blossoming the wood must be ripened, the fleshy shoot grown in the shade will not always throw buds. To induce it to do so it must get into the hardening sunlight for a period. Pots started on a shelf on an eastern sheltered aspect throw fine shoots, and if these pots are, during the winter check, placed in a northerly aspect, the wood will ripen well, and on the appearance of buds may be again returned to the more sheltered eastern aspect, and when about to bloom may be taken to some warm place out of the direct sun and out of the wind, where the blossoms may expand uninjured. It should not be a place where the atmosphere is humid, such as a cool, moist bush house.

Amongst the phyllocactus the blooms are of all sizes from an inch across to ten inches, and vary in colour from white and yellow to orange brown and deep reds through every shade of pink and all sorts of elusive, indescribable aurora and rainbow tints and blends. The cereus have the largest blooms, but have not such a wide range of colour as the phyllocactus, the night-flowering cereus will have a blossom 20 inches across, a veritable Arabian Nights sort of flower, opening in all its chaste and delicate beauty late in the afternoon and drooping with the dawn.

The opuntias have none of the beauty of the cereus or phyllocactus, and are of the same class as our common prickly pear, the formation being larger or smaller, more oblong or more rounded, according to the variety; the larger varieties, however, form striking objects when skilfully used in landscape gardening.

The echinocactus have some of the beauty of bloom of the phyllocactus, and are interesting plants when used for hybridisation, or when grafted on cereus stocks to form grotesques.

The mamillaria are curiously formed plants, and are interesting more for their quaint forms than their flowers, and in some varieties make pretty pot plants, more especially the varieties that are known for their bright fruit.

In closing this paper I may say that all the classes above mentioned may be grafted one upon the other forming at will grotesque forms and combinations.—The Amateur Gardener.

The Dahlia.

Not to grow dahlias these days is to be quite behind the times. The Cactus class has enjoyed a long run of popularity, and has perhaps reached its zenith, at all events, for the time being. Of the other varieties the old fashioned "Show" is practically dead, but the single, the collarette, and the paeony-flowered, appear to be just coming into their own, in the matter of public favor. There is no doubt that these types include some of the grandest flowering plants of the autumn garden. Adelaide nurserymen have fortunately foreseen the growing favor which they enjoy, so that the amateur gardener will find a very wide selection of varieties to choose from.

Probably there is no plant which gives such abundant return for any care given it; and of course the root being perennial and increasing from year to year, a large stock may be quickly worked up from an original expenditure of a few shillings.

We forgot to mention the pompom class, this is likely to be as popular as either of the other sorts. The diminutive blooms have all the characteristics of the type, and the plants are such abundant flowerers that they quickly earn for themselves a leading place in the gardener's heart. The long-stemmed, many-colored blooms are excellent for house decoration, and with reasonable care have the additional merit of lasting an unusually long time in water. Their season of flowering is—if the plants are kept well picked—a long one, and coming, as the dahlia does, at the end of autumn, they make a bright display at a time when the rest of the garden is losing its summer glory. They are, of course, one of the hardiest of plants, and with watering, mulching, liquid manure, and frequent cultivation, there is nothing to prevent the most amateurish of amateurs, enjoying a blaze of color, in great variety of form, for many weeks of the year.

The following notes will be found helpful by the many whom we hope will take up the Dahlia this year—

Towards the end of this month and the beginning of December is the best time for planting all varieties of the dahlia. The disadvantages of too early planting are that the plants will then bloom in the hottest of our hot weather, and the blooms are often scorched and spoilt before they are properly opened, whereas when planted on the later date they come into bloom in the cooler months of autumn, the flowers are finer and last longer, and are altogether more satisfactory.

— Soil. —

The dahlia is a greedy feeder, and delights in the richest of soils. For this reason the beds (and they always do best when plante out into beds by themselves should have a thorough prepara tion beforehand. Cover the be thickly with manure, cowdung you can get it, but stable manur will do. Dig deeply and turn i in. A week later repeat the oper ation, and the bed is ready fo planting. This thorough prepara tion of the dahlia bed is one of th chief aids to the successful cultiva tion of this plant.

— Position of the Bed. —

The best position for a dahli bed is one where the plants ma receive any amount of sunligh and warmth, but where they ar at the same time protected fron all boisterous winds. The growt is very brittle, and even wher tying and staking have been care fully attended to, are very liabl to injury from this cause.

— Transplanting. —

This should be done towards th end of this month. The plants propagated from cuttings or divi sion of the root, should not fo best results be nearer than 4ft. t each other, and some of the gros and tall growers will have to b placed 5 and even 6ft. apart. Be fore planting mark the positio that each plant is to occupy wit a small stake. Make a hole larg enough to contain all the root and deep enough to allow of a de pression being made around i without exposing the tuber. Th idea of the saucer-like depressio round each plant is to give roon to accommodate a mulch and t prevent the escape of water whe watered.

Place stakes early in position These may be made of bamboo o jarrah, and should be at least 6 or 7ft. in length. When the growth is a foot long it is time to make the first tie. The best tying material is "raffia," procurable at the nurserymen's.

As the plants grow, water and hoe regularly, for the ground should never be allowed to become either dry or hard. Once a week, after a drink of clean water has been given, give a dose of weak liquid manure. This application of manure water to do the most good should be such that it reaches the whole of the root area.

— Propagation. —

The dahlia is propagated by seed, by division of the root, and by cuttings.

By Seed.—Seed may be sown this month. Sow it in a seed

box containing a well-drained sandy loam. The seed is exceedingly easy to raise, and will come up as thickly and evenly as zinnia seed. When the seedlings have four or six leaves prick them out singly into small pots (3in. diameter) containing a nice loose and rich soil. When they become established in these, and are throwing out fresh leaves, transplant into a prepared bed, leaving a space of two or three feet between each. Give a good watering as soon as they are put out, and a mulching of some short stable manure. It is also a good plan to place a stake in position at the same time, so that it may be ready when the stem of the seedling requires tying. Keep the ground between the seedlings hoed, so that no weeds may cumber the ground, and the moisture prevented from escaping.

By Division of the Root.—This is the way most commonly practised by amateurs, because it is so easy and simple. The only thing to be careful of is to be sure that a piece of the crown is on each division, otherwise it can make no growth. The best method is to start them into growth first by placing them in moist sand, and then with a sharp and stout knife divide up the roots, so that there is at least one green shoot on each.

By Cuttings.—The best cuttings are made of the shoots which spring from the crown. To secure these the tubers should have been placed in a box filled with sand and placed in a sunny position in September. To grow these and later ones. Keep the sand in the box moist, and the tubers will soon throw out shoots. When these are 3ins. long they are ready. Take them off close to the tuber with a sharp knife. Insert the cuttings in pots containing a nice loose soil and an inch of pure sand on top. If the pots may be placed in a propagating house or on a hot bed so much the better, but if these conveniences are absent place them in a warm yet shaded place. As soon as the cuttings show that they have struck, by showing new growth, repot them off singly, using a little richer soil, some in which powdered cowdung has been mixed. When the roots comfortably fill fill these they are ready for transplanting.

Potting Hints for Amateurs.

Plants of all kinds, when being re-potted, require clean pots, a size larger than those they have been taken out of, so that there may be space enough left between the plants ball of roots and pot for the addition of fresh material to keep up vigorous growth. Along with cleanliness, drainage demands careful attention, for no matter what the plant is or how good the soil may be, if drainage is defective failure may be expected. Plant pots should be drained according to size—one piece of broken pot into a thumb-pot, three or four into a 3-inch pot, and so on. The larger the pot the more pieces of broken pots are required. All should be carefully placed in the bottom of the pot, keeping the spherical side of the broken pieces uppermost. When the flower pots are, say, 8 inches and upwards in diameter, a few large pieces should be placed in the bottom and covered with a handful or two of pot-shreds broken up to the size of nuts, and freed from dust. This, with some moss or fibrous turf laid on the top, firmed and levelled, will be found to answer its purpose well.

The size of the pot the plant is being moved into must be decided on according to the nature of the plant. Slow-growing plants should not be allowed too much space, as the soil tends to become sour before the roots can fully occupy it. Sometimes such plants are greatly benefited by having their existing mass of roots slightly reduced, and then re-planted in a pot of the same size containing clean drainage and fresh soil. This operation must be accomplished at the plant's season of starting into growth. Quick growing and gross-feeding plants require liberal treatment, consequently must have more pot room. In every case there should be room enough around the root mass when in the pot for placing and firming the compost in such manner that no vacuum may occur, so that when watered the whole may receive equal benefit. For obvious reasons such flower pots should not be filled too full of soil; leaving about ¾ inch from the top allows convenient room for watering, without risk of washing the soil over the sides of the pot in an untidy fashion. In this manner of potting there is also sufficient space left for giving liquid nourishment to gross-feeding plants.

Further nourishment to such plants can be effectively supplied by top-dressing, when all the old soil should be removed from the top of the roots and replaced by fresh material in which a sprinkling of some artificial manure has been mixed. This is an excellent plan for sustaining the energy of a plant which may be considered too large to be disturbed. Soil should be kept fairly moist, not in a state of dust-dryness, but so that it can be comfortably worked among with the hands. For the majority of our greenhouse plants a mixture of leaf soil, loam and sand makes a suitable potting compost. For young plants light material should be used that is, mostly sand and leaf soil; for old plants more loam may be added.

Amateur Floral Decorations

To the lover of flowers there is joy in sharing with others the pleasure to be derived from their beauty.

In the garden, in their natural form is to be found the greatest beauty of flowers, but fortunately they may be separated from where they grew and retain much of their beauty so that we may share with others the delight of their contemplation, in our homes, or elsewhere. Gathered in loose sprays or with more formal arrangements of what we call boquets is the most useful manner of assembling flowers to show their beauty in a decorative way, or to enhance the enjoyment of some occasion.

The present tendency to group together separate kinds and even separate shades of color of one kind of flower is commendable and yet we desire change and variety, and we sometimes choose to have varying tones of color in our groups. Then it becomes necessary to consider harmony of colors. Most generally, though not always, we find that there is no decided shock to our sense of the fitness of association when grouping together the various colors of any one variety of flowers. Those who have made a scientific study of color harmony can tell us all about color complements and dissect the rainbow to illustrate their ideas. We need not burden our minds with set rules, nor must we be able to define the various distinctions between lavender, mauve, ecru, with the varying shades of lilac' bluish purple, and heliotrope, or the finer distinction of red, from pink and rose through carmine, magenta, solferino, cerise, crimson and scarlet, to know if we have placed together shades which seem to clash, like false notes in music. The one who cannot discern fitness of association in colors after careful comparison, will not be helped much by committing to memory set rules on color harmony.

It is accepted as orthodox in floral arrangement that we may make free use of white or green among other shades of color for contrast or an effect of finish, and yet it is often necessary to consider how the green shall be placed next our flowers. Pansies and many other flowers may nestle among foliage without loss of good effect, but try your asters, zinnias, dahlias, and many other varieties in various ways and it will be seen that the beauty of the flowers is most effective when kept above the foliage as Nature has provided.

It is generally the case that the foliage of any particular kind of flower is the most suitable accompaniment, but it is not always convenient to provide snch, and the add tional green is often unnecessary when the flowers are in vases. If the flowers are carried in the hand, or arranged in a spray, some finish below the flowers is necessary in addition to the trying on of ribbon.

The professional florist makes provision for a supple of green foliage for use as occasion requires, either with boquets or designs The strictly amateur flower grower is not likely to have a supply of smilax, the ornamental varieties of asparagus, or suitable ferns, therefore, use must be made of whatever material is to be had. For use as supplementary green, divided foliage is desirable. We may as a makeshift at times make use of the leaves of schizanthus, cosmos, aquilegias, and some ferns with more suitable material if it is to be had. Immature foliage wilts easily, therefore that which is full grown should be used if detached from its branches. It should be placed in water in a cool place for several hours before being used in a bouquet or design. The one who is generous with flowers will be rewarded with more, because gathering of flowers prevents seed-bearing, thus inducing the plant to produce more. For house or other indoor decoration, perhaps no flowers are more satisfactory, than the gladioli. They are so lasting through renewal, by succession of flowers until last bud has expanded. Much satisfaction can be had from the gladiolus by growing a number of each shade in several choice kinds. Many kinds of flowers as for instance the snapdragon have to a considerable extent the quality of renewal through development of succeeding buds. Nearly all of our hardy perennials are suitable for cut flowers, and many of them will give a succession if the first flowers are used and the plants are kept well cultivated. A goblet and saucedish give opportunity for a combination of flowers with the longer stemmed varieties above and short stemmed flowers like pansies, balsam, or alyssum in the flat dish below. When arranging flowers in platters or shallow dishes it is not always convenient to provide sand or moss as a supporting material. A few leaves and stems of plants—it may be clover even—serve to keep the flowers above the water. A piece of wire netting can often be used to advantage as a support to the flowers in these flat arrangements.

I have known of ladies who have shown wonderful ingenuity in combining moss and wire and twine as a base for beautiful creations in floral work. There are times when friend-

ship leads us to desire to make some formal arrangement of flowers and with sphagnum moss, fine wire, tinfoil and toothpicks in hand it is possible to make pleasing combinations from material which could not be used in an ordinary boquet. There are times when pansies make such a generous growth of foliage that one may feel free to cut the spray from the plants. These, if arranged in flat bunches of five or six sprays to a bunch can be assembled together on the surface of a casket or table in the form of wreath, star, cross or other design. The same idea may be carried out with some other flowers.

In arranging baskets of flowers, do not have the flowers packed too solidly together, nor yet standing out singly as if stuck in sand. In baskets or designs do not forget that the green should be subordinate to the flowers and that some shades of pink flowers look better if kept away from than if bedded in green.

The Hoe.

Every man who has a plot which he would keep in order, should be very busy with the fork and the hoe. These tools are essentially dry-weather implements. In drought time they are invaluable. They, in the hands of the busy man, break the surface as often as it should be broken, keeping the moisture that is well below the surface in the place where it should properly be. This is the first thing that we would make a point of telling. And another point would have reference to the mulching of the beds, an operation second only to that of surface tillage. Lucky is the man or woman who has an unlimited supply of manure in hand for this work. Mulching prevents the heat getting too near the stems and roots. It also acts as a layer of food for the roots. Every watering that is done carries something into the ground for the benefit of the plants. With a manure mulch on the surface, deep digging, proper draining, and a water supply that can be used on occasion, there is no need to fear the worst that the season can bring. It is only when we have scamped our work that the shoe begins to pinch. And pinch it does when the trenching has not been deep, when the draining has been overlooked, and when the mulching has been forgotten, and when there is no water to use. Dry times hold a lesson for us all. We can in a measure, reduce the losses by doing the preliminary work properly, and by sweating a little with the chipping hoe.

Orchids.

The orchid is one of our most beautiful flowers. One of the species not only catches insects, but keeps its long tentacles continually in motion to get hold of them. The orchids which live in the air spread their roots abroad to absorb the moisture in the atmosphere, and they solve the problem which scientists are trying to perfect, viz., of taking nitrogen from the atmosphere.

It is impossible to kill orchids by having too much moisture in the frame or conservatory, though many are annually killed by keeping the atmosphere too dry. Never try experiments with valuable orchids—follow the accepted treatment only; experiment if you like with the common and cheaper kinds.

Many of our orchids grow on year after year and yet produce only one flowering pseudo bulb annually; but some varieties, if the plants are cut, will produce back shoots or breaks, thus increasing the number of flowering growths, and sooner making fine specimens. Cattleyas and Dendrobriums may be readily treated in this manner, but it must be borne in mind that no orchid is to be cut except when in vigorous health, and not then except it is to produce back growth. The operation is quite simple:—Take a plant, say, with four or five black pseudo bulbs and cut the rhizome in two between the bulbs, not otherwise disturbing it, but allowing the bulbs to remain in the same place. The season of rest is the best time for doing this, as when in vigorous health they often produce two growths. When it is desired to increase the stock of a good plant, take off a piece, a lead and a back bulb (sometimes it is possible to take the two back bulbs) and be sure you have a good sound eye for the start. The new shoot will break into growth and can be potted off at once, and kept in a shady place for a few weeks, after which it may be brought to the light. Some orchids do not like to be disturbed, while there are others which readily submit to this treatment.

Help Others.

There is a disposition among some gardeners to hide their knowledge under a bushel. When approached by a beginner for information upon any given subject, they invariably know nothing. These men seem to wish to hold a monopoly of the cult and think a question is a matter to be resented. When you meet a man of this class leave him alone. He is no use to you. Drop him at once. Go a bit further on and see how you fare. You are certain to do better. Someone will give you the information that you require. All through the garden world it is a matter of ask and ye shall receive. Those who both close their eyes and shut their mouth will never know anything. Go through the world with all your wits about you. There is quite enough in the things which surround us to engage our fullest attention.—Exchange.

Pulverisation of the Soil.

On light, easily-worked soils pulverisation may be said to exist always, and seeds and plants could be, on such soils, placed in the ground almost immediately after digging, but on heavy clayey soils it is almost a mad action to place seeds and plants therein until pulverisation has taken place.

The chief object of pulverisation is to give scope to the roots of plants and more especially, vegetables, for without plenty of roots no plant will become vigorous, no matter how rich the soil it be growing in.

The more the soil is pulverised the more fibrous roots are increased therefore the more extract is absorbed and the more vigorous does the plant become. Not only is it beneficial previous to planting or sowing, but also during the progress of vegetation. Applied between the rows of plants in this manner it also operates in the way of pruning, by cutting extending fibres, causing them to branch out, thereby increasing the pores of the plants ; and such food as is in the soil is more sought after and taken up by them.

Pulverisation also increases the capillary attraction of soils, by which their humidity is rendered more uniform. Doubtless capillary attraction is greatest where the particles of earth are finely divided, as gravels and sands hardly retain water at all, while clayey soils, not opened by pulverisation, either do not absorb water, or, when it is absorbed, they retain too much. Water is not only necessary as such to the growth of plants, but it is essential to the production of extract from the vegetable matters which they contain, and unless the soil is so constituted as to retain the quantity of water necessary to produce this extract, the addition of manures would almost be in vain, as manure is useless to vegetation till it becomes soluble in water.

Pulverisation also increases the temperature of the soil, and in a warm season is of great advantage in admitting the nightly dews to the roots of the plants. Soils being among the worst conductors of heat, it is necessary to have the surface of the soil open, so that there may be a free entrance of warm air and tepid rain of spring, as water is known to be a condenser and solvent of carbonic acid gas which, when the soil is open, can be at once carried to the roots of vegetables and greatly assist in their growth.

The piece of ground that can be cropped immediately after being turned over is in itself a treasure, and more especially so if manure has, at the same time, been added, as the process of fermentation will go on faster when the soil is loose than afterwards when it becomes compressed with its own gravity, as the advantage of the heat thus obtained in exciting vegetation, whether in seed or root in spring, when the soil is cold, must be to a great extent dependent thereon.

The depth to which the soil is pulverised must depended upon the nature of the soil, as in rich clayey soils it can scarcely be overdone. Even in sands, unless the subsoil

contains some organic elements hurtful to vegetables, deep cultivation should be practised as when the roots are deep they are less apt to be injured in a time of drought, and, besides, if pulverisation was performed for a length of time on the top spit only, the surface would get light and spongy, while the lower part would become compact and cold.

Pulverisation may or may not afford food for plants, but at all events, it certainly does provide the plant with an increased number of "feeders," as well as rendering the securing of the food by the "feeders" much more easy. Those who work on a light soil (already pulverised) can hardly realise, unless they have to do it, how thankless a task it is to produce vegetables on a heavy stiff, clayey soil, as getting "things" to start seems a difficult task, and, besides, those who have lived on a cold soil, consisting of clayey land, will have noticed that almost to the surface of uncultivated land the subsoil has, so to speak, crept up, and, without fear of contradiction, I venture to say that the advantage of deep pulverisation cannot be over estimated.—Exchange.

She: I think it very strange that man was made first. He: Quite the natural order. Money has to be made before a woman can spend it.

Readers! Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Fruit Garden

Notes for the Month.

Oranges and lemons may still be budded, taking care that well developed and matured buds are used. Apricots and peaches should be budded as soon as properly matured wood can be obtained. Olives may be grafted, though it is getting late for this. This grafting should be done about three inches beneath the ground, and after the graft is made the soil should be heaped round the stem.

As the fruit develops on apple and pear trees, put bandages round the stem. Carefully examine the trees at least every week for signs of Codlin moth, and pick off any which may be affected.

We would like to impress upon fruitgrowers, especially the owners of a few trees, the value of training and shaping their trees. "As the twig is bent, so is the tree inclined," is an old and true saying. By training we do not mean the butchering which some people appear to think the height of art in pruning, but in the case of young trees it means the nipping out of superfluous twigs and keeping the growth in the direction best suited to forming an open, low branched, well spread tree, which will in future years be easily kept to the required shape.

Propagating Citrus.

Reply to "R.S.T."

Propagation of the orange tree is generally carried on by seeds. The seed bed should be a sandy loam, into which must be worked some well rotted stable manure. The seeds must be covered with a fine coating of sandy loam, over which is sprinkled some well rotted manure as a mulch. The seed bed requires watering every day—on no account must the seed bed be allowed to dry out. A watering can, with a very fine rose, must be used for watering. The bed must be shaded from the hot rays of the sun, and hot summer winds. The best covering is a frame work of wire netting, about one foot high, and covered with brushwood. Hessian stretched on a frame may also be used. After the plants are about an inch high the frame work may be raised another foot. When the plants are well above the ground they require watering every other day in warm weather. The secret is to keep the soil moist, and the plants growing strongly. On no account allow any check to their growth. No weeds should be found growing in the bed. The second season (about one year old) the trees are planted out in the nursery. Rows should be set out three feet apart, with the plants one foot part in the rows. Only plant the sturdiest seedlings. The ground should be constantly stirred during the summer to conserve moisture. During the first summer no trimming is necessary. All foliage is required to shade the trunk, and to produce a well rooted tree.

— Budding. —

Budding is always to be preferred to grafting, and may be done either in spring or late autumn. The buds must be taken from well grown wood of the present season's growth, and from a prolific bearer. Another precaution is necessary—do not use bulbs from year the base of the scion, or you may have almost barren trees. In making the bud cut off about one inch of the bark, and allow a thin piece of wood just under the bud. The budding is done in the usual manner by making a T incision in the stock, into which the bud is inserted. For tying use thin strips of calico which have been dipped into grafting wax made thus:—Beeswax, 4 ozs.; resin, 4 ozs.; tallow (mutton). 2 ozs. If the calico is too stiff use a little more beeswax. Dip the strips in the melted wax and then draw them between two straight edge sticks, to take off surplus wax. Just before the buds start into growth cut off a little of the top of the tree. As soon as growth starts in the buds, it may be tied to the remaining portion of the tree for support, or preferably to a stake. This is a safeguard against the high winds of spring and summer.

Apple and Pear Trade.

COMMENTS BY TRADE COMMISSIONER.

The Trade Commissioner in London (Major A. E. Norton) has forwarded to the Government a report on the marketing of apples and pears, in reply to various statements which have appeared in the Australian press in reference to the vast difference there seems to be between the prices Australian shippers receive for their fruit and those charged by the retailers throughout England. The report states :—

"It has been often stated by Australians returning to their native States from England that while Australian apples and pears are sold in Covent Garden and other markets at prices that are almost unpayable, they have noticed the same class of fruit being sold in baskets in Bond and Regent streets at prices which worked out at 2d. to 6d. for each apple and pear, and all through the London suburbs and in the provinces small sound Australian pears were selling at 3d. apiece, and Australian apples from 4d. to 6d. per lb., and in consequence there must be some huge profits for these retailers. Taking last season for instance, the inference is that fruit sold at about 7/ to 9/ per case in Covent Garden was eventually retailed in London at 2d. to 6d. each, and in the provinces at about 5d. per lb., thus showing a profit to the retailer of something like 7/6 a case. These statements are misleading, and prove that the little knowledge gained is dangerous to the well-being of the producers. The statements are not explicit enough to mention the variety and quality of apples and pears seen ticketed up in Regent street at 2d. or 6d. apiece, neither do they state the varieties or condition of the apples that averaged comparatively such low prices in Covent Garden. They single out a few of the most expensive shops in London streets which are patronised by the class of people who would just as soon pay 2/- as 2d. for an apple if it were something they fancied. The number of this class of shop can be counted on the fingers of one hand, and the quantity of fruit they could take for the whole of the season is infinitesimal compared with the general supply. The apples one sees in the shops referred to are Cleopatras or Jonathans. On looking up the average price for these varieties for the last week in April, I find it to be about 9/6 per bushel. They take it for granted that a retailer is able to sell 40 lb. of apples out of every case, but if put down at 30 lb. it would be nearer the mark. Since I came to England the first time I have seen hundreds of cases turned out, and I can assure you that, weighing them in bulk, the average is anything between 36 and 38 lb. net. It is quite the exception for a case to weigh 40 lb. net. It will be remembered also that the retailers have to weigh out in single pounds, hence my reason for saying that will be nearer the mark than 40 lb. The reports also generally assume that every apple in every case will turn out sound, and be fit to sell at 5d. per lb. This also is far from being correct. It is the exception, rather than the rule, for a retailer to get all the apples out of any one case fit to sell at full price. There are some in every case that have to be sold at 'cooking' prices. For instance, say a man buys 'Cleos' at 9/6 per case, by the time he allows for the actual weight he is able to get out of a case and the waste, the fruit will cost him more like 3½d. to 4d. per lb. It will accordingly be seen that the retailer after all does not get too much profit. During the past season I have personally sold thousands of cases of Cleopatras and Jonathans, and the lowest price that I took for any that were sound was 8/ per case, and the average large quantity were sold at 4d. per lb. retail in order that the purchaser might keep 'clear decks.'

"Remarks in regard to the retail price of pears is still further evidence of lack of knowledge. Last season pears that were in any way sound were realising 24/- per bushel at auction, or about 6d. per lb. My experience as a shipper from when the industry commenced, and a seller this end for six years, has shown me that the reason for the alleged poor returns is because there is considerable fault both ends, and I consider it is not to the interest of the producers to lead them to believe that it is due entirely to methods of handling at this end, or to the retailer. That the producer has suffered through having unnecessary charges piled up on him in London I am well aware, and on many occasions pointed out where the trouble lies and also suggested remedies. Such remedies, however, the producers, I regret to say, have been slow to adopt. Co-operation on the part of the growers has been very strongly urged for some years past, and until the growers fully realise the importance of this movement I fail to see how they are to get the control which will enable them to regulate the selling this end, or improve the methods of grading and packing their end. I am not losing sight of the fact that in South Australia there is a number of most careful packers whose fruit on arrival in England is a credit to themselves and the State. At the same time we cannot shut our eyes to the fact that the number of indifferent packers predominates. It is the very large quantity of badly graded and packed fruit that is an important factor when considering the causes for low prices. To a very large extent the benefit derived as a result of good packing is considerably discounted by the heavy supplies of poor quality and damaged fruit."

Fruit Canning.

In this paper we are going to discuss canning as it may be done by any woman in her own kitchen with ordinary cooking utensils. I prefer the porcelain-lined, granite or aluminum pans for cooking fruit, as one is less liable to burn or scorch the contents. Use glass jars for holding the fruit. There are many new kinds of jars on the market but the most widely used is the Mason jar as most of us have a supply of them on hand. New rubbers must be had each season, old rubbers stretch and the air is liable to get in.

Placing the new rubbers in warm water, in which a little soda has been dissolved, will put them in good shape to use. Do not use covers that are bent out of shape or in which the porcelain is cracked or broken. It is best to replace all defective covers each season and save loss of fruit.

In the old days fruit and vegetables were prepared for winter use by preserving and drying. At the present time, canning is an almost universal way of keeping for winter use some of the fruit of which we have such an abundance in summer. The syrup for preserving fruits is much heavier than that used for canning. Bacteria do not grow rapidly in any syrup and cannot penetrate one with a large amount of sugar Bacteria causes fruit to spoil—molds act in the same way. Consequently, bacteria which are in the fruit must be destroyed and the air which contains them be excluded. When a liquid containing fruit boils, bacteria are destroyed; then if the fruit be put in jars that have been sterilized and the air completely excluded the contents will keep indefinitely. I have kept fruit two or three years and found it in perfect condition when opened.

To prepare the jars for holding fruit immerse in boiling water—see that the water covers the jars completely, inside and out, all at one time, so that they heat through evenly. Boil the covers thoroughly.

Choose fruit which is ripe, but not over-ripe. Always select the finest fruit for canning to get best results. Place in kettle with enough water to keep from burning, add sugar if you wish, or it may be canned without and sweetened when used. Boil until tender and put into sterilized jars; fill to overflowing, that all air may be excluded. Press fruit in jar gently with sterilized silver knife to further dispel air bubbles, then fill again to top. Take covers from boiling water and place quickly on the jars and screw tightly. After covers have been fastened turn jars upside down and place on table. In this way any leakage will be discovered. In about ten minutes try covers and tighten if possible, for as the glass cools it contracts. Set jars aside to cool and before removing to store room test covers once more to make perfectly sure that they are air-tight.

For canning apples—pare, quarter and put in cold water to prevent discoloration. Make a syrup, about a quart of sugar to three pints of water. Bring to a boil; drain apples from water and place in syrup. When ready for canning the apple should be translucent but firm.

Pears and peaches may be canned in the same way as apples—of course the amount of sugar used varies according to the kind of fruit. Many prefer steaming peaches and pears in the cans as they are less liable to lose shape and color. Strawberries, raspberries, black berries, blueberries and plums are very fine cooked in the cans. Wash the jars carefully—clean the fruit thoroughly—place it in the jars until full, shake down carefully and fill again. Have ready a syrup made of granulated sugar and water or put sugar in jars with fruit and fill with hot water, being careful not to crack jars. My rule for using sugar is half a pound to a quart of strawberries or blackberries; quarter of a pound to each quart of raspberries or blueberries; three-fourths of a pound for a quart of currants or plums. When jars are filled remove covers from boiling water place on jars. Put jars in a steamer or on a wooden rack in an ordinary wash boiler or kettle. Fill boiler up to the neck of the jars with water the same temperature as the jars. The small fruits need but ten minutes boiling, the larger from twenty minutes to half an hour. Remove jars from steamer or boiler, take off the covers and throw into a pan of boiling water. Press fruit gently to remove air, fill to overflowing with boiling syrup or water, quickly replace covers and screw on tightly. Test as in canning fruit boiled in a kettle, by placing jars upside down and when cool, tighten, if possible, once more.

In conclusion, I would say that successful canning of fruit is not such a hard task as many would think. Good sound fruit, kept at the boiling point until sealed, clean jars and utensils are the secret of success. —American Exchange.

Bessie: Wonder if Maude knows that we are looking at her new gown? Jessie: Certainly; what do you suppose she is walking down this street for.

The Apple Export Trade.

—Hull as a Distributing Centre.—

In the course of an interview with a representative of the Advertiser, Mr. J. F. Kruger, who is visiting Australia on behalf of Messrs. White & Son, of Hull, spoke very strongly in favor of direct shipment to Hull instead of sending the bulk of our crop to London as is at present done.

"If they adopted this course," said Mr. Kruger, "they would find it most advantageous. The chief advantage is the lower charges that obtain in Hull as compared with those in London. At Hull the docks are controlled by the railway companies, but the Port of London Authority has full charge of the London docks. Then Hull is admirably situated as a distributing centre. The markets there are attended by the wholesale buyers of the North and Midlands of England, from the Scottish border down to Birmingham and to Yarmouth in the east. That district represents a consuming population of about ten million people, and the freights on produce to those districts are considerably less from Hull than from London.

"What is wanted is a direct steamer service between Australia and Hull, so as to avoid the payment of the heavy London dock rates. What little Australian fruit is handled now at Hull comes via London on a through bill of lading, but in such cases there is a proportion of the London charges to be added to those of Hull. The advantage of sending apples to Hull in preference to London also applies to the export trade in meat, wool, and butter. The heavier London charges are also avoided by sending direct to the northern port, and when cargo is landed the distance by rail to the populous Midland centres is not so great as from London. Wool shipped through Hull would reach the manufacturing centres more cheaply. As an illustration of the difference in the dock charges at the two ports, it may be mentioned that at Hull the cost of wharfage and delivery of meat from ship to railway is 2/10 per ton, as against 9/5 in London. In Hull cold storage and delivery, including rent for 28 days, costs 13/10 per ton, as compared with 23/8 in London. There is also a difference of 4d. per case in favor of Hull in the dock charges and selling charges of apples. It would be clearly an advantage to Australian shippers to send direct to Hull. Freight from Australia to the two ports is the same. Of course, the stumbling block is the steamer service, but surely if wool, butter, meat, and fruit were sent there should be no difficulty in securing tonnage."

Lime in the Garden.

Of all the constituents of garden soils none is of greater importance than lime. Upon its presence in sufficient quantities depend not only the maintenance of a relatively high state of productiveness, but also, in no small measure, the successful checking of terrestrial insect pests. "Why are the gardens infested with grubs and myriads of soil pests?" asks Mr. Cousins in the "Chemistry of the Garden"; "Why do not our peas flourish with bright green leaf and bountiful luxuriance? Why are our applications of manure so ineffectual and without good result?" And he answers that in nine cases out of ten such perplexities may be traced to the fact the soil lacks lime.

Even in this progressive age it is certain that some of the simplest of scientific truths are yet very imperfectly understood; in fact, I think I am not far wide of the mark in saying that in some of the cases they are purposely and bigotedly ignored. It is not difficult to find gardens in which tons of manure have been buried through a series of many years, without any attempt having been made to supply the necessary modicum of lime. Small wonder that such gardens become the happy hunting ground of pests innumerable, or that plants are sickly and unprofitable in such a rooting medium. The soil, especially if it be of a clayey texture, is sour and "livery," it resists the beneficial penetration of the air, and is unable to yield up its store of plant food to the famished roots. This latter fact should be particularly emphasised. In soil such as we are considering a continual waste of valuable potash from the surcharged humus is going on, simply because the soil does not contain the element capable of fixing the surplus, and converting it into a form available by the roots of plants. That element is found in carbonate of lime, i.e., lime naturally "slaked" by the action of the air and soil-water. Even the potash the humus retains is locked away, and rendered largely inefficient until it is liberated as carbonate of potash under the influence of lime. The utility of artificial potash manures, too, is directly proportional to the amount of carbonate of of potash the soil-lime is capable of producing. In this form the potash remains in the soil until assimilated by vegetation, undiminished in any appreciable degree by the percolation of rain-water.

The rich ammoniacal properties of organic manure, again are entirely dependent for their efficacy upon their conversion into a nitrate by the bacteria of the soil; and as these minute organisms cannot do their work without lime, the necessity for this substance is forcibly apparent in this regard also. But, independent of these facts, lime is in itself a real plant food, entering into the constitution of nearly all vegetable organisms in considerable proportions. Fruit trees, especially stone fruits, derive great benefit from a periodical dressing, partly, no doubt, because lime forms a suitable base for the phosphates of which they stand so much in need. On heavily manured land then, an application of slaked lime, say every three years, should never be forgotten. It produces porosity of clayey soils, and renders sand more retentive of moisture; in fact, it is conducive in every way to a high state of fertility.

Kitchen Garden

Notes for November.

In damp situations or in sheltered places on the plains, where water can be freely given, successive sowing of radishes, mustard, cress, and lettuces may be made for salad. It is rather unfortunate that when salads are most acceptable during the summer they are difficult to grow on the plains. In the hills, of course, they grow to perfection with as little trouble as anywhere in the world. They are, therefore, always procurable at reasonable rates, but the pleasure of eating home-grown stuff is denied most people.

Where water is available plots of potatoes may be sown, and they should be ready for digging in February. There is a tendency for potatoes to grow too much tops and few tubers in summer, but with judicious watering they will do all right. The ground needs to be kept moist and well worked. One great point is to keep the plants growing, and one cause of frequent failure is allowing the bed to get too dry and then watering heavily.

There is not much difficulty in growing carrots and parsnips on the plains during summer when a moderate supply of water is available. A bed sown now will give a good supply of these vegetables in autumn. If possible select a sandy soil, but if that be not available work the land deeply, and keep it as light as possible. Always keep it moist below and loose on top.

White and red beet and onions may be grown through the summer very well by giving the same treatment as recommended for carrots. They will not pay for water on a large scale, but for the home garden are profitable. On the other hand, it is waste of time, seed, water, and energy to sow peas, broad beans, turnips, cauliflowers, and cabbages now. It is not the actual heat of our summer which is the difficulty, but the excessive dryness of the atmosphere. This could be combated by anyone with a sufficient supply of water, and the determination to grow these crops, but it is simply not worth the trouble where there are localities within a few miles where they grow with unsurpassed luxuriance under natural conditions.

The special work in the vegetable garden on the plains during the month is the care of the summer crops, such a tomatoes, cucumbers, marrows, trombones, melons, capsicums, egg fruit, French beans, sugar corn, sweet potatoes, and artichokes. In the hills the whole list of kitchen vegetables can be grown.

Make successive sowings of French beans at intervals of a fortnight or three weeks, so that there will be a constant succession right through the summer. As with all summer crops, the ground beneath the dwarf beans should be mulched if possible. The watering should be plentiful and regular. The gardener in this case, as in others, should avoid the feast and famine style of watering. A sprinkling of superphosphate hoed in occasionally before a watering will help the crop. Give, say, up to, but not more than ½lb. of superphosphate evenly distributed from 6ins. to 1ft. on each side along a row 16ft. long at one application, and give the application once a fortnight.

It is not too late to make sowings of melons, trombones, marrows, tomatoes, cucumbers, capsicums and egg plants. Cucumbers, marrows, and sweet melons should be up in about seven days, while water melons will take a fortnight. If the seed be soaked over night in warm water several days will will be saved. There is nothing to be gained by sowing in pots now.

Jerusalem artichokes, which are a tuberous-rooted sunflower, should be coming up now, but it is not too late to plant tubers. Plant as you would potatoes and water well. The crop will not be ready to dig until it dies down next autumn. It is a pity this vegetable is not more widely grown, it is very delicious, yields well, and is easily cooked.

Tomato plants should be put out at once. There are various ways of training them to keep them off the ground. Probably the easiest is to plant in a row 18ins. apart, the rows being 5 or 6ft. apart. On each side of the row stretch a piece of wire netting on stout stakes driven in at an angle of, say 45 deg., thus making a V-shaped trellis, up which the plants will climb. In this way they will need very little or no tying, and the fruit will be easily gathered. Staking is good, so is training to vertical wire netting. A certain amount of pinching out of lateral shoots is desirable.

French Beans.

This plant is a native of India and is essentially a summer crop. There are many varieties, some of bush or dwarf, and some of climbing habit. It is quite useless to think of growing French beans successfully except where water can be used liberally, but with that an available succession of crops can be kept going as long as the hot weather lasts. No crop is easier to grow and no summer vegetable is more delicate, healthy, and popular. The soil should be free and well drained, deeply cultivated, and if not rich freely manured with well-rotted stable manure. To this add a liberal dressing of superphosphate, say, 2 to 6 lb. to the rod of land; or, say ½ to 1 lb. to every row 16 ft. long. Apply the manure before the ground is dug, and mix it thoroughly with the surface soil. The watering will afterwards carry it down.

Potatoes and Potash.

Experiments at Rothamstead throw important light on effect of fertilisers on potato blight. The potatoes in a particular field were repeatedly and carefully sprayed with Bordeaux. The dates of the successive applications (says an exchange) were as follows:—June 27, July 7, August 3, and 18. Early in August it was noticed that the leaves of all the no-potash plants were beginning to blight, while the foliage in all the plots to which potash has been annually applied still appeared to be practically unaffected. The blight made rapid progress on each of the five no-potash plots, while the foliage of the vines upon all the other plots for the most part ripened normally. Practically all the leaves on the no-potash plots were dead by the end of August, at which date there was still considerable foliage on the other plots. There was no decay of the tubers, however, on any of the plots, but the marked inferiority in yield on the no-potash plots was, no doubt, in considerable measure due to the relatively early death of the foliage. George Ville, the celebrated French agricultural chemist, found in his experiments that the suppression of potash reduced the crop of potatoes from 9 tons 16 cwt. to 4 tons 4 cwt., and wrote on the subject: "Whenever soil does not receive potash, or where it gets no manure, the plants are poor and stunted, with withered and dry leaves, and that, too, in the month of June, when the other plants are still in a state of luxuriant growth. As for the tubers, they become wrinkled, withered, and reduced in size, their preservation being almost impossible. . . .The lack of potash in the soil is coincident with the potato disease, whence we may draw the conclusion that when plants are deprived of their chief mineral constituent, and consequently of one of the most essential elements of their existence, they become a prey to inferior organisms, such as microscopic fungi, etc." "Queensland Agricultural Journal"

Storing Potatoes.

A leaflet recently issued by the English Board of Horticulture states that as a preventive of an attack of winter rot in potatoes, the tubers should be well dried before storing. Flowers of sulphur sprinkled over them at the rate of 2 lbs. to the ton will destroy the fungus, and also hold in check woodlice, etc., which by their movements convey the spores throughout the mass of tubers. Potato stores of whatever kind should be well ventilated. Land that has carried a diseased crop should not be again planted with potatoes for some years afterwards. Kainit, at the rate of 5 cwt. to 6cwt. per acre, applied to the drills before planting the tubers, or as a top-dressing before the horse-hoe is used for the last time, will help in preventing attacks of this fungus.

The Egg Plant.

The egg plant should be grown for a trial in every garden, as it is one of the most delicious vegetables known. Sliced and fried in butter, served with raw tomatoes, it can well take the place of meat for supper in the summer or autumn. We recommend early plants to be raised in pots or seed-pans, placed in a cool frame. When the plants are thoroughly established, plant out in rich soil, where they are to fruit. At this time they may be sown in the open, Allow plenty of space between each. When well grown this is a very ornamental plant. The fruit, which can be used either before or after it is ripe, is prepared for table in a variety of ways.

— Notes on Cooking. —

Fried.—Peel the fruit and cut crosswise in slices of full diameter and of one-third of an inch in thickness; sprinkle salt between the slices and set aside for half an hour, then remove the water, dry and dip in butter and bread crumbs and fry in hot lard until brown. Baked.—Peel the fruit and cut into small pieces. Place in a pan with butter and olive oil over a fire for three minutes; add gravy. Take it from the pan, and put it in a baking dish, coat over with bread crumbs and cheese, and bake in oven till quite brown.

"I understand that T. A. Edison says that concrete shoes will be all the rage soon." "Gee! I guess I'll speak to your father right away."

Edith: Pa is immensely pleased to hear you are a poet. Ferdie: Is he? Edith: Oh, very. The last of my lovers he tried to kick was a football player.

Spring Work on Citrus Trees.

Oranges and lemons of all ages should now be in a position to start into vigorous foot and head growth, and to ensure this the soil must be loose, rich, moist and perfectly sweet. Weeds are often an advantage to citrus trees during winter, especially where frosts and raw winds prevail, as the green covering of the soil tends to keep the roots warm. But now it is time that the surface be cleaned and prepared for a feeeding, irrigating and mulching , so that the trees are placed in a good condition to meet the summer. Any green manure should be ploughed in at once, and not buried deeply, or it may cause sourness, and thereby insure the tree roots. This is a good season at which to thin out crowded living and dead wood from trees which are either too dense or dirty with scale or other pests. Bear in mind that citrus trees do not call for hard cutting, but only thinning out, and the thinning should not go beyond removing such wood as is evidently crowding and starving more useful parts. Both oranges and lemons can make good leaves, flowers and fruit in shady interiors of trees, and it is only where the leaves are seen to run very small or disappear altogether from the inside that we know more light and air are necessary. Hence the thinning is usually at the top of the tree, that the light may fall through and stimulate useful leafage in all parts. For economy in pruning citrus, light branches may be removed outright, as where snippings are made of every individual piece of small and faulty wood, no end of work is involved, without any better results than follows from what may be termed branch thinning. Don't allow strong sunlight to fall direct on to citrus wood, or it will be overdried, and possibly burned and permanently injured. When trees have been thinned, smear all hard and dirty wood with a lime and salt wash, to which has been added sufficient cow dung to make a thick brown paint. If the trunks of trees are at all long and exposed, or the trees are old and make too little wood to yield useful fruit, then bandage the trunks with a good thickness of bagging, At the same time use a hand tool round the base of the stem to loosen and clear the soil, and place a heavy and moist mulch over the ground before it becomes dry and over-heated by the advancing power of the sun. Chemical manures of a quick acting kind are most useful stimulants and may be given now, but these cannot wholly supply the trees' needs, and a heavy mulching of good solid manure should be regarded as the chief means of keeping up the vitality and profit of a citrus grove. When the manure supply has been equally divided between the most needy trees, collect all weeds and free soil from headlands, outside paddocks, the banks of the creek, any ditch clearings and such other material as will prove at once a food and a source of protection during the hot, dry season. If irrigation is practised, mulching and feeding are equally necessary, for citrus very quickly exhaust soil where water is always present to liberate its food supplies. Citrus trees should never be flooded with broad sheets of water. The land requires close furrowing, and the water sent down in small sections or checks, and the surplus drained off as promptly as possible. A certain amount of surface grading should therefore be regarded as a necessity at this season. The age and condition of the tree should be well understood before applying irrigation water, as young citrus which have not obtained a free grasp of the soil are often ruined by over-dosing with water. A light ploughing or cultivating should follow closely on irrigating, that a loose surface may provide the necessary air, prevent a hard pan forming, and retain the water as long as possible. Where no water is available, free cultivating should be carried out as often as possible. By following the foregoing instructions, in as far as they apply to different soils and situations, the best will have been done to secure a vigorous and profitable growth during the coming season.—Exchange.

Spring Irrigation.

Water should be used in distinct accord with the condition and wants of the individual tree. We know quite well that water cannot often be kept under such complete control as to secure greatly varying supplies to a single foot of ground, but in a general way we lack system in irrigating our orchards and do not properly control the supply according to the land and the varying trees it carries. First of all make provision for getting rid of any surplus. This means that where the under drainage is not sufficiently sharp to secure a sanitary and free soil the headlands, ditches and main channels and depressions of the block should each and all be graded and properly prepared to carry off any surplus water as soon as ever it becomes a surplus. Prompt cultivating should always follow irrigating in spring, and this is seldom possible, unless the surface and under drainage are both elaborated before applying the water. Different soils, climates and trees call for different amounts of water, and somewhat different methods of applying, but in nearly all cases we over irrigate and under cultivate. The orchard work is of course to be judged by results, and where heavy watering is found to pay handsomely we do not say give less, but there are many who make more work for themselves and so regularly reduce the returns from their orchards by over watering. A good deal of useful working knowledge is now accumulated in the best irrigated districts, but there is also room for a great deal of improvement, and growers one and all should make careful note of the effect of different volumes of water applied in certain ways and seasons so as to obtain a safe working standard for every soil, situation and class of tree.—Exchange.

The Gooseberry.

The fruit succeeds best in the cooler districts of Australia, but also does fairly well in many of the hotter portions. It will grow in almost any kind of soil, but a deep sandy loam suits it best.

In preparing land for a gooseberry plantation, see above all things that there is a good drainage, either naturally, by an open, porous subsoil, or artificially, by means of underground drains, not less than 2½ feet deep and 40 feet apart. There is no plant more impatient of stagnant water at the roots than the goose berry, and no plantation will be a success unless the land is well drained.

Gooseberries do best in a plantation by themselves; many orchardists plant them amongst the fruit trees in the orchard, but this plan is not commendable, as they are in the way when working the orchard. In preparing the ground for planting it should be deeply ploughed in the spring time, and allowed to lie fallow through the summer, scarifying it once or twice during the latter. In the autumn, about the month of March, the land should again be deeply ploughed, eight inches at least, and then the harrow should be run over it to level it down. The ground will then be fit for planting.

The plants should be planted in rows six feet apart, and six feet between the plants in the rows. This will permit of the ground being worked by the plough and horse hoe during the first few years of the plant's growth. Planted at six feet apart, it will take 1,200 plants to plant an acre. Do not plant too deeply, as the bushes, when planted should have a clear stem above the ground of from six to eight nches. If any suckers are attached to the roots, cut them clean out with a sharp knife, in order to prevent them from suckering again. The after cultivation of the plants will be the ploughing of the ground in the autumn with a small one-horse plough, when the furrows should be thrown up against the plants, leaving a furrow down the centre of the rows. Let it remain in this state during the winter; in the early spring the furrow should be turned the reverse way, and the strip of ground left in the rows should be levelled into the furrows with a strong hoe, which will leave the ground again level. Stir occasionally to keep weeds down and the soil loose.

Pruning is one of the most important points in connection with the cultivation of the gooseberry. Most people imagine that the gooseberry will grow without any care whatever in the way of pruning, but this is a great mistake, as it requires the same careful treatment in pruning as do many fruit trees. It takes quite as long to prune a gooseberry bush properly as it does to prune an ordinary fruit tree. Most of the gooseberry bushes have a pendulous habit of growth and it should be the aim of the pruner to combat this tendency by cutting the main branches always back to a bud with an upward tendency. In pruning the first season after planting, thin out the branches of the bush; these should be shortened back to 3 or 4 inches from the stem. The following year all wood should again be cut away, with the exception of the continuation of the main branches; these should be shortened back the same as the branches; also cut out all the spray shoots from the centre of the bush. The pruning for the fourth and subsequent years will consist of deciding on wood to be left to form branches. See that these are properly spaced at fairly equal distances one from the other, are not too crowded, and that no shoot is crossing another. All young growths from the centre of the bush will have to be kept clear. If these instructions are followed out, the branches will be lined with fruit from the centre to the extremity, thus facilitating the gathering. Where time is available, an early summer pruning could be given by pinching back all young growths except these wanted to enlarge the bush. In pruning those varieties of gooseberries with a strong upward growth, always cut back to an outside bud; in other respects, the pruning will be the same as given above. The gooseberry bush is by no means the short lived plant many people suppose. If it is properly looked after and cultivated, it will live and be profitable for many years.

Gooseberries are usually propagated from cuttings. Take strong, young

roots, and cut them into lengths om a foot to 15 inches long. The ase of the cutting should be cut ean across, just under the bud; then t out all the buds with the excep-on of four at the top, as this will event the plant from throwing up ckers afterwards. Plant the cut-ngs in rows two feet apart, and six ches between the cuttings. They ould be put in slanting, leaving the ortion with the four buds above the ound. The cuttings should be trod-n firmly in, especially at the base. he next year these will be fit for ansplanting. In planting out the ung plants, any small roots that ay have formed high up on the stem ould be cleaned off, leaving a clear em of eight inches.

The Depth to Plant Potatoes

A matter of very considerable im-ortance to growers of potatoes is the pth at which they should be plant-. The experience gained by other untries is very useful in dealing ith this subject, and from the nited States, where the Agricultural epartments make exhaustive re-arches into matters of interest to e man on the land, we have some-ing reliable. At the Nebraska Ex-eriment Station tests have been ade as to the relative advantage of ifferent depths, from 1 in. to 5 in., nd the total yields from the tests ere as under:—Planted 1 in. deep, 92 lb.; planted 2 in. deep, 188 lb.; lanted 3 in. deep, 298 lbs.; planted in. deep, 317 lb.; planted 5 in. deep, 97 lb.

There was a very noticeable differ-ence in regularity of tubers between those of shallow and deep planting. The tubers from shallow-planted seed formed near the surface of the ground as was noticeable at digging time. It is probable that the irregularities in moisture and temperature of the sur-face-soil checked the growth of the tubers at certain times and started a second growth at other times, result-ing in the production of knobs on the tubers (compound tubers). The tubers from deep-planted seed, on the other hand, were down in the ground, where they were less subject to fluctuations of temperature and moisture, and, therefore, showed little second growth. The crop from seed planted 5in. deep contained almost no compound tubers. and that from seed planted 3 in. and 4in. deep was but little worse. The crops from seed planted 1 in. and 2 in. deep, however, had many com-pound tubers. The best depth for planting seed, therefore, from the standpoint of yield, was also the best depth from the standpoint of quality. As between the 4 in. and 5in. depths, there is little choice in yield, and the slightly better quality of the tubers from seed planted 5 in. deep is pro-bably more than offset by the extra labour in digging them. Of the 3 in. and 4 in. depths of planting, the lat-ter gave a somewhat greater yield produced equally as good tubers, and caused no trouble in digging. The indications of this one test are, there-fore, that 4in. is about the proper depth for planting seed tubers. The 1 in. and 2 in. depths are certainly not to be considered under ordinary conditions, since such shallow planting is not only apt to reduce the yield materially, but also to produce ir-regular, compound tubers.

How to Grow Cucumbers.

This is the time for planting the general crop of cucumbers, and as every reader who has a piece of land 10 ft. square can grow enough for a family, I propose to tell him how it can be done. There are many ways of growing cucumbers. I shall not tell him every way, and, it may be, the methods I give will not be the best for him, but it will give good results.

People generally advise a great deal of preparation for growing cucumbers, such as digging out a trench, putting in a foot of manure, making a seed-bed of 4 in. of soil on the manure and planting on the soil so prepared. This will give excellent results with care in watering; but with such a hollow bed below the plants will not stand any neglect. Still, the method is worth following for early plants; but in this case the manure needs to be new, or, rather, in the fermenting stage, so that it will really make a hot bed, which will force on the young plants.

For ordinary purposes no such pro-vision is necessary. What is necessary is to thoroughly work the soil, as must be done where good results are desired in any gardening. The more deeply it is worked the better, pro-vived the surface soil is kept on top. Liberal supplies of manure should be worked in, and the more rotted it is the better. Either horse, cow, sheep, or fowl manure will do; and, failing those superphosphate or bonedust, wood ashes, and sulphate of potash —say from one to two pounds of super, and from half a pound of sul-phate to a plot of 10 ft. Do not give more, and thoroughly mix it with the soil.

— Planting the Seeds. —

Make the bed so that the water will not run off when you have to apply it freely in the hot weather. Two plants only are required for the space named (10ft square), and a propor-tionate number for a larger space; but in order to secure the most robust plants I would plant at least six seeds where I wanted one plant. I plant the six in a circle about a foot in diameter, and when the strongest plants have runners 6 in. long I pull out all but two, and when the strongest plants has runners a foot long I remove the other. The removal of a healthy plant requires courage. and hence most growers have their plants too crowded.

While the plants are growing they require to be well watered, and regu-larly, but not sodden, and when they commence to develop fruit liquid manure, or "Cow tea," applied twice or thrice a week is decidedly good, if not necessary for the best success. Briefly, soak cow-dung in water, and give a little, say half a gallon, diluted until it is only slightly colored, twice or three times a week. Water every evening moderately, rather than now and then heavily.

When the runners begin to bear female flowers, i.e., those on the end of tiny little cucumbers, the ends may be nipped off. Side runners will put out, and also bear fruit, and many be treated in the same way. This nipping is not really necessary, but in the hands of a skilled man is beneficial.

When the plants are thinned out I like to mulch the ground well with stable manure and keep the bed well covered.

Intense Culture.

Recently, at a meeting of the Campbelltown branch of the Market Gardeners' and Fruitgrowers' Association, Professor Lowrie dealt with "Some Principles Underlying the Growing of Vegetables.

The most important consideration in the work of the market gardener, said the professor, was the quality of his produce. Good management in having the stuff ready a little earlier or a little later, as the case might be, than the period at which the market was glutted or relatively well supplied counted for much; but it was ever quality that found the best sale and realised the most satisfactory prices. Heavy yields, of course, contributed materially towards financial success, but these might be discounted largely through lack of quality, and accordingly the aim of the market gardener, and even more so the fruitgrower, should be to combine the heaviest yields with the highest quality. Leading factors which made for this ideal were :—(1) The careful selection of seed and of the most improved varieties of plants and trees suitable for the climate and the special purpose in view; and (2) thorough, systematic and intelligent tillage, amendment and manuring. Land, within easy reach of the market, was limited, and of high value. Consequently, every effort must be made to utilise it to the fullest extent. Each factor which conduced to continuous growth must be husbanded or applied, for any check or succession of checks through excess of moisture or lack of it, imperfect or injudicious tillage, and inadequate nutriment or lopsided manuring tended to lower yields and to inferior quality. The market gardener was the apostle of intense culture—he must force the pace or fall in the competition, or, when owner of the land, be satisfied with less than the average returns or less than the normal reward for his time and labor.

— The Principal Factor. —

The predominant factor in ensuring the greatest success in some of the areas in that district and over the major portion of the market gardening land in the hills, where the rainfall was heavier, was the application of lime to the soil. It appeared as though the value of lime as a means of increasing the fertility of the soil had been most difficult to understand, when it was remembered that those who broke up the rich alluvial flats in the first instance had found it with all its wonderful latent wealth unexploited. Consequently they had been able to go on cropping the land for many years without feeling the need of adding lime. The time had come, however, when this must be applied, and the sooner the position was recognised, the better it would be for the land and for the pockets of the producers. In their endeavor to get the heaviest crops in the quickest time they had been dressing the land heavily year after year with stable manure, but, apparently, they had overlooked certain noteworthy facts. Before the benefit of the fertiliser could be obtained it was necessary that it should decompose. That process proceeded through the agency of nitrifying ferments—microscopic organisms. If the conditions were favorable, these ferments performed their work of disintegration rapidly; but if the conditions were unfavorable, the decomposition was not effected to anylike like the same degree, and there remained in the soil organic acids which made it sour. As a rule sour land was considered to be wet, cold land, which had become waterlogged and was difficult to aerate. In the case of the market gardeners, they might have good underdrainage and work their land thoroughly and frequently, but if they failed to put into the soil the elements which ensured the continuous and proper activity of the nitrifying ferments they must expect it inevitably to become sour.

— Most Desirable Stimulant. —

The most desirable stimulant they could apply was lime. One often heard the remark, "Lime sweetens the soil." What happened was this: The lime as a base united with the nitric acid formed by the ferments and produced calcium nitrates. Heavy rain and continuous cropping had leached most of the lime out of the land, and it had therefore become a matter of primary importance for the gardeners to replenish the supplies. No doubt one reason why lime had not been employed more widely and regularly was the relatively high cost of it, and another probably was that many people believed it was useful only for ameliorating the physical texture. Lime undoubtedly helped materially to make stiff land more porous and open, but that was only one of its influences. The other, even more important, was that it increased the activity of the nitrifying elements. It was also a means of supplying indirectly potash to the land. These did not represent all the benefits derived from the use of lime, but they were sufficient to justify him in directing their attention to it, and strongly urging them to give it a thorough trial. They must not expect much resultant good in the first year. Time was required for the lime to do its work, and it might be two, three or even four years before they would see the full effects of dressing.

— Various Limes. —

The merchants apparently had awakened to the fact that there might be a good market for agricultural lime, and those who desired to use it could now obtain supplies at a reasonable figure. Quicklime (not carbonate of lime) could be purchased at 23/10 a ton, bags extra; and lime ash, which contained about 70 per cent of lime and 30 per cent of wood ash and sand, at 1/6 a bag. Hydrated lime was quoted at 2/3 a bag on trucks. He contended that it would pay well to apply frequent dressings of lime at those prices. It was worth bearing in mind that part of the super or other phosphates, especially soluble phosphates, which they introduced to the soil, were bound up fast and insolubly in the form of phosphate of iron and phosphate of aluminum. The iron seized upon the phosphates, entered into combination with them, and formed an insoluble salt. There was no better method of overcoming that combination, and of getting the full benefit of the plant foods contained in it than by the utilisation of quicklime. If there was a deficiency of lime in the soil it was utterly impossible to reap the utmost advantage from the artificial and other fertilisers.

— Quicklime the Best. —

Weight for weight, quicklime, of course, was the best to apply, because there was more lime in it. There was the same amount of calcium oxide in 56lb. of quicklime as there was in 100lb. of carbonate of lime. He was having some experiments conducted with shells from the Spit, near Kingscote, Kangaroo Island, and believed that they would prove to be thoroughly successful, and probably lead to enormous quantities of the shells being used in the orchards and market gardens in the hills, where lime was required. Samples of 100lb. of shells, when analysed, had revealed 94 per cent of carbonate of lime, equal to about 54lb of quicklime. Supplies of the shell could be secured for 13/- a ton

ompared with 26/- a ton quick-me. By acting in co-operation ie producers could purchase an l-engine and crushing plant for, y, £300, instal it on the Spit, id have the shells crushed there efore forwarding. The shells could applied to the land as they ere, but their action would be uch more rapid if they were st crushed to powder. Of course the price of quicklime fell to £1 ton there would not be any need go to Kangaroo Island for sea ells, and as things were the ne-burners had a good case, but doubted, whether there could be ich an appreciable lowering of ice as that in view of the costs the burner.

— Under-Drainage. —

Another means, he contended, by hich increased returns might be tained from the market garden-g land was by under-draining. ie average South Australian re-rded the man who talked under-drainage as hopelessly theoretical. He invariably observed, "Why, we have not sufficient moisture as it is." Where there was not a free drainage in the winter the land became water-logged and spuey. Crops grown on such land were the first to show the effects of dry conditions during the summer. The removal of the excessive water in the winter would result in the soil retaining the moisture better in the summer. The statement appeard to be contradictory, nevertheless it was a fact. The existence of under-drains allowed the water to go down. As it percolated through it was followed by the air, a most desirable happening. When the land was water-logged the water excluded the air, the roots remained near the surface, and so soon as drought set in it began to suffer. By properly draining and aerating the soil the roots penetrated deeper, had a larger area from which to obtain their food, and thus enabled the plants to more effectively withstand a dry period. In answer to questions, Professor Lawrie said a fair dressing of lime would be about 1 ton to the acre. However, applications of 5cwt. to 7cwt. of quicklime at frequent intervals would meet requirements probably. It was possible to incorporate too much lime with the soil, but where vegetables had been raised continuously for many years that was not likely to occur. For all round general use gypsum was far behind carbonate of lime. As a means of opening up the soil its value was relatively small, and it was not comparable with quicklime as an agency in increasing the activity of the nitrifying ferments. In laying out an orchard the tilling and all other essential work should be done with absolute thoroughness right from the start. He would not advise putting lime in the holes when planting trees, but it would be well to work some in periodically afterward, as it would undoubtedly induce the roots to lead out. Like potash, lime increased the sweetness of a lot of the fruit, especially oranges, and made them more palatable.

"Have you sent off your wireless telegram?"

"Yes."

"And ordered your horseless carriage?"

"Yes."

"And paid off the motionless messenger boy?"

"Yes."

"Good. Let's go and get a glass of hopeless beer."

Living Soils and Dead.

— Action of Bacteria. —

The latest scientific demonstrations prove that soils are either living or dead, which means that soils without bacteria are dead soils, and as such incapable of producing profitable yields of either crops or grass. Every land owner should know something of the food that bacteria must have and of the conditions required for the proper utilisation of this food. It is known that a heap of fresh manure will in time become darker in color, and shrink in size; that manure added to the land "rots" and disappears; that the bodies of buried animals, or crops of clover, vetch or rye, ploughed into the soil, vanish in time and become an indistinguishable part of the soil itself. Yet it is not generally realised that the disappearance of these substances is the result of vital activities, and that the universal process of decay may be stopped by preventing the growth of bacteria, as is actually done in canning factories. It is a fact that the process of fermentation is never suspended in the soil, except when the latter is frozen.

Another fact is that abundant, but not excessive, moisture, a favorable temperature, and a plentiful supply of air stimulate the activities of soil bacteria. Also that a soil may contain a relatively large amount of partly decomposed vegetable and animal matter (humus) and yet may fail to offer enough food for the vigrous growth of useful bacteria. It has to be remembered in this connection that soils are formed slowly out of weathered rock, that they become gradually richer in vegetable matter and bacteria. The day comes at last when these virgin soils make the acquaintance of the implements of tillage. And as the furrows are turned, as the soil is mellowed, and as the air and water and sunshine are made to mingle with it, the bacteria are stirred to activity. They have food in plenty, and they attack vigorously the plant and animal materials that had been accumulating, perhaps throughout many centuries, as virgin sod and forest mould.

Under lengthened settlement, however, the lean years come, and the farmer wonders why his land is growing less and less productive. The soil that was once dark in color, and mellow to the touch, as if instinct with life, has become lighter in color and lifeless to the touch. Why this change? And what of the bacteria that were so generously fed in the newly-established fields? An answer to these questions may be found in the history of every agricultural country.

It is not so much the quantity of humus in the soil, but the quality of it that regulates the growth and activity of bacteria. The chemist finds quantities of plant food in many so-called "run down" or "worn out" soils. Yet, notwithstanding the abundance of plant food, the crops do not yield profitable returns.

Humane Treatment of Horses.

(B.M.S., in "Albany Country Gentleman.")

It pays to treat farm animals kindly. The steers or hogs dogged around, kicked and abused generally do not fatten so well as those humanely treated; and the maltreated cow does not give so much milk as the one kindly treated and petted. No farm animal gives a greater or more substantial return for kindness than the horse. The abused horse is never safe. Fear is his constant companion, and he may kick or run away at any time. He wears much faster than the animal not kept at a high nervous tension, and galls and sores directly reduce his capacity for work.

Farm animals are treated much more humanely now than they were fifty years ago; but there is yet much room for improvement. I was yesterday looking through some agricultural papers published more than forty years ago. An article gave directions for castrating. After the operation "the sack should be filled with salt or ashes and sewn up." We are assured that if this is done not more than one in five or six will die. The application of salt or ashes to the cut surfaces and sensitive membranes was, of course, entirely needless, and occasioned much suffering. Such barbarities are not recommended in agricultural journals to-day. So far as I know, they are nowhere practised in this country. But almost every day I see horses working with galled shoulders or sore backs or sides. These sores make the animal suffer, and reduce his capacity for work. In 19 cases out of 20 they would be prevented by a little, very little, intelligent care. Such care is profitable in dollars and cents, not to speak of the higher motive for its exercise.

Sometimes galls are the result of ignorance, not indifference. Two hours ago I saw passing a horse with a very sore shoulder. I knew his owner and driver well—not a cruel man, but unintelligent, having a very poor "thinker." I called to him and asked why he drove a horse with such a shoulder. He said he had to use the horse, and had done all he could to get the shoulder well, and he called my attention to the grease he had put on the sore and to the pad—and the pad was placed right on the sore. When I enquired why the pad was so placed (where it had aggravated the evil), I was told that it was soft and ought to make the pressure on the sore spot easier. It had not occurred to the driver that the pad so placed really increased the pressure on that spot. In ten minutes there was a good pad just above the sore and another just below it, and none over it; and my friend had some instructions about curing galls, which I will repeat.

But, first about a good pad. It is not a very thick one—usually half an inch in thickness when the animal is pulling is better than more—but a broad pad; and it is never stuffed with cotton or wool, which forms into hard lumps, and which does not lose its elasticity. A had pay springs the collar forward as soon as the draught is removed, resting and cooling the shoulder.

As for those instructions the first is a don't. Don-t put grease of any kind on a gall. It softens the hide, increasing the probability of its being broken and worn off; and if the flesh is exposed, grease keeps it tender and more sensitive while not aiding so much as some other things in healing. The best preventive of galls, after properly-fitting collars, is strong salt water, used as a bath on the shoulders each evening. Its use should be begun four weeks before the animals are put in the plough in the spring. I wrap a cloth around one end of a corncob, on which a string will hold it securely in place, on account of the cob being rough. A handful of salt is thrown in a fruit can kept for the purpose, the can is nearly filled with water, stirred with the cob till the salt is dissolved, and then the bath is applied with the cob and cloth. This salt-water bath is also the best cure for galls of which I know. It reduces inflammation and swelling very rapidly. If the skin is broken, wait till a dry film is formed over the exposed flesh (which will soon form when the pressure of the collar is removed) before applying the bath.

The best preventive of galls is well-fitting harness. Harness should never be bought when the animal is not at hand to be fitted. This is true of all parts of the harness, and particularly of the collar. There is as great a variety in horse's shoulders as there is in men's noses, and because a collar fits one horse is no reason why it should fit another. Before a callar is purchased every part of its face should be carefully pressed, so that if there are hard lumps in the collar, or if it is harder in some places than in others, it may be rejected. Very many collars are poorly stuffed—one side is harder than the other. Such a collar will never be satisfactory to the man having a wise regard for the comfort and usefulness of his horses. One can fit a collar somewhat to a shoulder by cutting a slit along the groove in which the hames fit pulling out some of the stuffing, and pounding down the face of the collar with a stick of wood having no sharp corners. A slit should never be cut in the face of a collar.

A sore on the top of the neck may develop into a very serious thing. Nearly always it is caused by one of two things—lack of the proper flap of stiff leather under the straps, or improper hitching, which means a heavy weight on the horses' necks. This last is to be avoided for the additional reason that it adds much to the fatigue of the team. Farm machinery is now so constructed that there will be very little weight on the horses' necks if they are properly hitched. If the tongue does not play up and down in the neck yoke ring, one should make an investigation Home-made implements, particularly rollers and drags, are frequently so constructed that there is so much weight on the horses' necks that their labor is increased at least one-half. Sometimes only the reconstruction of the implement will remedy this, and sometimes placing the whiffle-trees underneath instead of on top of the tongue will make the end of the tongue balance as it should.

First Councillor: The acoustics of this board room are very bad.
Second Ditto (sniffing): Indeed! I don't smell anything.

Early Breeding of Cattle.

A tendency towards early breeding from fillies, heifers and ewe lambs has developed during recent years, and seems likely to be pushed too far, especially in the cases of those who have not sufficiently studied the subject. There it a longing to be "up-to-date," as though the breeders of forty or sixty years ago were not up-to-date, because nature does not alter her methods, and the principles which developed the Shorthorn and all our other improved breeds are as true to-day as they were in the days of the Collings or Bakewell.

The question of early breeding, in the opinion of Mr. John Wrightson, who contributes an article on the subject to the "Live Stock Journal," "is not to be solved by appeals to nature, but experience; and I venture to say that experience is in favor of postponement rather than hurry. It has recently been stated that cows milk better and breed with more certainty if brought into the dairy at or before two years old. I am entirely opposed to this view, on the ground that it is extreme. Six months makes a great deal of difference in the life of a heifer, and I have no objection to two and a half to three years old. Consider what calving at two years old means. A cow grows until she is six years old, and is a mere baby at fifteen months. I have looked through Mr. Sinclair's 'The History of Shorthorn Cattle,' and taken out every opinion as to the proper age at which heifers should bring forth their first calf, and the following quotations are the result :—Mr. E. Cruickshank.—'When heifers are highly fed when young, and do not produce a calf until two and three-quarters or three years old, they are at a great disadvantage as milk producers; if the breeder wishes to do his heifers well, so as to help the sale of them, they should produce a calf when twenty-seven months old, so as to prevent the filling up of the milk ducts with fat.' Mr. W. J. Hosken, Cornwall, writes—'We like our heifers to take the bull at two years old, at which age they stand a better chance developing into larger cows than when bred younger.' Mr. T. H. Hutchinson, Yorks, writes—'The heifers are served when they are between eighteen months and two years old,'"

Mr. Hugh Aylmer, well known in his time as a breeder, took care to have his heifers well grown and in good condition, and it was his custom to put them to the bull at fifteen to sixteen months old, and he considered it risky to allow them to get more age, "lest they might prove uncertain breeders." At the Holker herd, managed with great success to the late Mr. Drewry, the heifers were put to the bull so as to calve at or about two and a half years old. In Northumberland, we are informed that "the heifers in herds of high class produce their first calves at about two and a half years old. In Monmouthshire in several herds from which young bulls are sold to farmers at about 25 guineas each, and the feeding of the stock all round is very moderate all through, "the heifers are mated so as to bring their calves when three years old." In Somersetshire and Gloucestershire, we read "one advantage of dealing liberally with heifers in regard to feeding, is that they may calve at the age of two and a half years, instead of at three years old." Mr. William Housman, writing of the management at Sittington, Clyne and Middleton, Aberdeenshire, stated that "heifers were generally put to the bull so as to calve at from twenty-four to twenty six months old. This early breeding tends to reduce size, and must be met with liberal feeding. When, however, the breeding is put off for another season, the risk of permament infertility is greatly increased, and a year's rest at three or four years old generally enables the animal to come to its full size." In the case of an Irish herd, it is stated that "it is not desired that the heifers should calve until they were two and a half years of age, or a little older"; and Mr. R. Welsted of Ballywalter, says :—"It is arranged for heifers to produce their first calves between two and a half and three years old."

"The foregoing," remarks Mr. Wrightson, "are all the references I can find in this work as to the age of breeding in the case of heifers, and it will be gathered that where two year old calving is practised, it is accompanied with very liberal feeding, and as a means of avoiding sterility. Such heifers are naturally of comparatively large size, but it will be difficult to extract any confirmation in favor of keeping heifers naturally, or in ordinary keep, and at the same time allowing them to calve earlier than from two and a half to three years old."

Bacteria in Dairying.

The importance of cleanliness in all matters pertaining to dairying cannot be too often insisted upon, but scares in connection with the presence of bacteria in milk are to be deprecated. If attention were paid to the wild declarations of some food faddists milk would be rejected as an article of daily food. Bacteria are invariably present in milk, and the development of certain species therein is necessary for the production of essential or desirable fermentations in butter and cheese making consisting in the former (butter) of the ripening process, in the latter (cheese) leading to acid development. There are desirable and undesirable bacteria, and while it is necessary to check the latter, it is a great mistake in doing so to kill the former. The lactic acid germ, for example, is a benevolent one, yet it is killed by either pasteurization or sterilisation. However, it is, of course, highly desirable that bacteria of undesirable character—that is, those capable of inciting taints or defects in milk or its products—should be excluded to as great an extemt as possible by strict attention of cleanliness. Writing on this subject, Professor Cornell of Ontario, says :—"Bacteria of undesirable character are nearly always derived from sources the reverse of cleanly—from manure and manurial dust, from bad water, from improperly cleansed pails and cans, etc.; hence to avoid these it is essential that care and cleanliness be excercised in milking, handling and storing milk. For bacterial development to occur, besides suitable food, the temperature conditions must be favorable, and practically we find that for most temperature becomes more favorable bacteria developing in milk the the more nearly it approaches the temperature of our bodies, 98 to 100 deg. F.; hence to prevent such bacterial development it is essential for milk kept for cheese factory use. It is as possible to infect milk during manufacture with undesirable forms of bacteria as it is at the farm; hence it is as essential that care be taken in handling the milk at the factory, and that everything which comes in contact with the same during manufacture be as clean as possible."—"Australian."

Wife: What would you do, George, if you were left a widower?" Hub: Oh, I snppose the same as you would if you were left a widow. Wife: You horrid wretch! You told me you could never care for anybody else."

The House or Typhoid Fly.

Prof. F. L. Washburn, State Entomologist, Minn.

It is well to realize in dealing with this subject that little flies do not become big flies; that a fly, or any other insect for that matter, never grows in the perfect or imago or adult stage; that when we see on the window-pane flies of different sizes, the litle ones should never be regarded as the young of the large ones, but as representing different species.

We are just realizing what a dangerous pest the house fly is. It is now called the "typhoid fly," though it is well understood that it is not the only fly, which may carry typhoid, and that if all flies were destroyed we still would have epidemics of tyhoid. The name, however, has served to call attention to its dangerous character, all the more dangerous because we have tolerated it so long in our ignorance of its true nature.

In taking up the subject of "The Typhoid Fly" the following questions present themselves:

1. Kinds of flies common about the habitations of men.

2. Varieties or species which are likely to enter houses, and having entered houses, to infest exposed foods; also the species likely to enter shops to infect meat as well as groceries and fruit exposed to their approaches.

3. Species infesting stables where cows are kept, or horses, or both; where the different kinds breed; their powers of travelling both by their own efforts, and by being carried.

4. Of those infesting houses and stables what species carry germs, how many are found in horses and on food.

7. Rate of multiplication of flies.

8. Hibernation of flies in houses, stables, etc.

Methods of prevention: (a) Prevention of breeding, (b) Screens, fly papers, poisons, etc.

Without burdening you with scientific names I will say that the flies we find about human dwellings, towns and villages, camps, etc. are the following:

First and foremost in abundance and in persistency, the common house or typhoid fly; second, the window fly, found on the window pane in connection with the house fly, and considerably smaller; the stable fly, especially obnoxious about stables and entering houses in the fall. This is the fly that, resembling the house fly closely, bites, or stabs us, and has given rise to the erroneous impression that the house fly bites. Further, the blue.bottle fly, the apple or pomace fly, the cluster fly, the non-biting stable fly, the lesser blue-bottle fly, the green-bottle fly, and one or two others of less abundance. Nearly 100 per cent. of these may and do enter houses; all of them may crawl over fruit and other exposed food. Any kind of meat would attract the house fly, and all the flesh flies, or blow flies. Almost, if not all, of the above would be attracted to garbage and other filth. In stables where cows or horses, or both are kept, one would find the stable fly and the house fly abundantly and other species sparingly.

It is a well established fact, as you know, that the house fly breeds particularly in fresh horse manure; to a slight extent, evidently, in cow manure; in almost any moist filth; to some extent in garbage, and, most significant of all, in human excrement. Composing as it does at least 90 per cent. of the above mentioned flies, it is therefore, the chief carrier of disease.

Turning then to the house fly, the violater against public health, we find the following well established facts:

Each female fly lays from 120 to 150 eggs; these eggs hatch in from eight to twenty hours, depending upon latitude and climatic conditions. The larva or maggot lives from five to seven days; the pupa the same. In other words, it takes about twelve days for one generation. It may hibernate in the pupal condition, either in manure, or on the surface of the ground. It also hibernates in the house or barn as an adult. There may be from twelve to fifteen generations in the course of a summer. Dr. Howard, who has done much work on the house fly, found in a quater of a pound of well infested horse manure on August 9th, 160 larvae, and 146 puparia of this fly, or about 1,200 house flies to a pound of manure. We have had some interesting figures prepared, showing the tremendous fecundity of this pest. A full grown house fly, the female hibernating in the house, will produce in the spring, at the lowest estimate, 120 eggs. Assuming that one-half of these will be females, and allowing the breeding to go on without check for four months, we have this enormous number as the progeny from one hibernating house fly, namely, 214,557,844,320,000,000,000,000. Now then, an adult house fly measures exactly one fourth of an inch long. The distance around the earth at the equator is said to be 24,800 miles. Allowing 5,280 feet to the

le, it would take 3,688,312,000 use flies placed end to end to around the world once. Using is number as a denominator, and e number of flies produced in ur months from one mother as numerator, we find that she ll give rise, in the course of the mmer, to enough flies to encir- this globe fifty times or more, d have plenty of progeny to are.

It is difficult to determine the ngth of life of the adult fly, for soon as we confine insects here they can be observed, we ace them under such unnatural nditions that the observations e not to be relied upon.

As regards its powers of loco- otion, and method of transporta- on, we cannot speak definitely as the distance a house fly can go its own unaided efforts. It is wever, that by making a series flights this insect could cover a nsiderable distance. It, never- eless, does not have to depend on its own power for getting om place to place ; railroad cars, reet cars, horses and other ani- als, carriages, automobiles, pro- sion wagons and meat carts, all their part in carrying this pest e of charge. We have seen untless flies on an empty fish x in a wagon carried along for veral blocks. We have also ted house flies on horses being iven in the country, attracted, doubtedly to the horses by the ell of the stable, carried possibly mile. The same can be said of es in a carriage, and all of us ve doubtless seen provision carts ing their rounds attended by arms of these uninvited passen- rs.

The house fly can and does rry germs on its feet, and on e hairs over its body, and in intestine. Many of these are sease germs, and that they may ing after passing through the testine is proven by finding liv- g bacilli in fly specks.

That flies may come from filth human food has also been oven by scattering lime on hu- an excrement, and noting that e flies which have walked over at, and colored their legs with is substance were later observed human food.

We have stated conditions under hich the house fly breeds. It is ll, perhaps, to also state that it s been quite established as a t that it will not breed at all dark places, and only to a very ited extent in a poorly lighted ace.

Of the diseases transmitted by the different kinds of flies I speak with some hesitancy, but I believe it has been established beyond question that it is absolutely certain that they may transmit ; typhoid, anthrax, opthalmia, tuberculosis, and it is further claimed that they may carry the typhoid bacillus in a living condition for over two weeks.

Eradication of Bracken.

By Alfred J. Ewart, D. Sc., _h. D., F.L.S.

The fronds should be burnt off if possible. If not cut off and used for bedding, or dried and burnt in heaps, they may be ploughed in if the land is at all poor in humus, but are then apt to be raked out again with the rhizomes.

The land should be ploughed as deeply as possible, and the rhizomes near the surface raked out in rows by a horse rake and then into heaps. If chaffed with hay, especially after steaming, and placed in a silo the rhizomes make bood nutritious food. The moment the land is clear and farly well broken up, potatoes should be planted and repeated a second year, or the first crop should be followed by drilled maize or some other green crop which can be worked between the rows while young and which when older covers the ground with dense leafy foliage. In this way a small but immediate return can be obtained while the land is being cleared, but in any case drainage will be necessary if the land is at all wet or sodden. Bracken land usually needs liming, half to one ton per acre, or even more when first broken up, and within two or three years needs ordinary farmyard manure. Phosphates will only be needed later on when grain is grown. The above plan has succeeded very well on bracken land near Melbourne, an immediate profit being secured from newly broken bracken land. — "Agricultural Journal." of Victoria.

Value of Molasses.

Prof. Thomas Shaw, the great live stock expert, says on this subject .—

The real value of molasses in feeding is greater than chemical analysis assigns to it, since when mixed with other foods it adds to the palatability and so increases consumption. It is probable that henceforth nearly all the molasses made at sugar beet factories will be mixed with the pressed pulp and dried before it is put upon the market. The product thus prepared is ready for feeding by simply mixing it with other foods, or adding it to them dry, but more commonly with all the water added that it will absorb. The objection to feeding a substance so sticky as liquid molasses poured over the feed more or less of which adheres to the feed boxes and in summer attracts many flies is thus avoided.

For cattle, molasses is being used in increasing quantities. Mixed with dried blood, it aids development in calves that are being prepared for the block. It furnishes an excellent complement to such food as cotton seed meal when fed to cattle that are being fattened. The produce has been much used in preparing animals for exhibition. It has thus led to increased consumption of the other food and improved the gloss of the coat. It is commonly poured over meal, or, what is better, over meal and cut fodders mixed. It is frequently diluted with water before thus mixing it. As a food for milk production it is fed in small quantities. Dried molasses beet pulp may yet be used extensively as a supplementary food for dairy cows, summer and winter. Until more light has been obtained, however, as to its influence on the breeding properties of animals, it should be fed with prudent caution, more especially to young animals intended for breeding.

In feeding sheep molasses has not been much used, but recent experiments at the Michigan experiment station have shown that dried molasses beet pulp had a feeding value for fattening sheep even higher than that of corn.

To swine molasses has been fed successfully along with skim milk. Its use, however in feeding swine will probably be limited, as an appetiser is less necessary for swine than for the other classes of farm animals.

For horses molasses is probably more valuable in feeding them when at work than in feeding any other class of farm animals. Not less than two quarts per day of cane molasses may be fed with advantage to work horses and mules for prolonged periods. The molasses is diluted with three times its bulk of water, and poured over the morning and evening ration. It is common to feed a little bran along with cane molasses to correct a tendency to constipation, which is said to result from feeding it. It is claimed that it is nutritious. healthful and economical. It may yet become popular to feed to horses that are being wintered on products coarse and cheap, and fed in the cut form.

Clarification and Purification of Drinking Water.

From Agricultural Gazette of N.S.W.

Water may be unsafe to drink from the excessive amount of matter in suspension—dissolved organic matter—or the presence of pathogenic micro-organisms. These few notes are not intended for the benefit of those in a town where there is a good potable supply, but mainly for the farmer and pastoralist unfortunately not possessing a good permanent supply of water.

During droughts the domestic supplies often have to be obtained from tanks used by stock. The water becomes very much polluted, and more or less unwholesome and unpalatable. At such times it is the misfortune of not a few to be obliged to drink water from a tank in which stock are bogged and even dead, and from which the water has a decidedly bad smell.

Many persons have a very mistaken idea that clear sparkling water is always pure and wholesome, and never hesitate to drink it freely ; but the slightest sign of turbidity causes suspicion. Water contaminated with sewage containing bacilli of typhoid fever, may be, withal, clear and sparkling, and yet the use of it unless purified would imperil the life of the drinker.

The most satisfactory method of clarifying and purifying water for domestic purposes is by boiling and filtering. However, boiling the drinking water for a household is tedious, and very few will carry it on for any time, even during a "typhoid scare."

Filtration, if effective, is very slow. The most satisfactory filters on the market can only be used when there is a sufficient pressure of water ; they are expensive, and they require a great deal of attention.

Stone filters, where charcoal or carbon is used, are misnamed. They may clarify water, but never purify it, inasmuch as charcoal is a suitable medium for the development of bacteria, and if water has a small bacterial count when poured into them it will certainly be more impure bacteriologically when drawn off for use than previous to the filtration. Yet they are found in many houses. The most appropriate place for these filters is in the grit box of the poultry yard.

— Muddy Water. —

Water containing mud in suspension is easily clarified by dropping hot wood ashes into it, or by the application of lime or alum. These two latter substances make the water hard.

Dr. A. C. H. Rothera, of Melbourne University, has conducted some very interesting experiments in the clarification of muddy water, the results being recorded in the Victorian Journal of Agriculture. The tests with the chemical precipitants, alum, lime, and chloride of iron (ferric chloride), turned out in favour of the iron. The lime is only able to compete on account of its cheapness. In choosing between alum and chloride of iron, the price is at first sight in favour of the former ; but weight for weight, 1lb. of chloride of iron is worth 2lbs. of alum. Chloride of iron is quite harmless, and a valuable mineral constituent for all animals. Medical men prescribe iron in one of its several forms as a tonic. It was found that 1lb. of chloride of iron clarified 1,000 to 2,500 gallons of muddy water. The water was also much reduced in its bacterial contents. In a Sydney wholesale druggist's catalogue, chloride of iron is 2d. per lb.

— Water with a Bad Smell. —

Water that has been contaminated by organic matter, as evidenced by the smell, should, if at all possible, be avoided. However, if its use is compulsory, something must be done to purify it. Boiling, although failing to destroy the smell and the soluble organic matter, will kill any harmful bacteria.

Dissolved organic matter may set up serious intestinal trouble ; but this can be guarded against by the oxidation of the organic matter by the use of Condy's crystals (permanganate of potash and soda). This substance is a deodorant and disinfectant. The crystals are added and the water stirred until a permanent faint red tinge is produced. Water would then be tolerably safe to drink.

— Cloride of Lime. —

Dr. G. G. Nasmith, Director of the Health Laboratories of the City of Toronto, Canada, and Dr. R. R. Graham, Assistant Chemist, have recently published a paper in the Journal of the Royal Army Medical Corps on a simple method of purifying almost any infected water supply for drinking purposes. The experiments are so interesting and instructive that I take the liberty of quoting the paper extensively in the hope that it may be useful to, among others, members of many municipal and shire councils in the State :—

Two years ago the first system for continuously purifying a municipal water supply by means of chlorine in the form of calcium hypochlorite (chloride of lime) was installed in the United States, the amount of available chlorine being 0.3 parts per million parts of water. The success of this method for one year has established its efficacy, and similar plants are now being installed at various other places. The method is so cheap, so efficient, and the agent used so harmless that there would seem to be a great field for its

usefulness in this and other countries. We have shown that 0.3 parts of chlorine in a million parts of water, or, roughly, one pound of chloride of lime to a million pounds of water (500 tons or 100,000 gallons) will not only destroy typhoid and colon bacilli, but practically all bacteria in water except a few spore-formers.

It is a valuable means of sterilising water, because chloride of lime may be bought almost anywhere, is very cheap in the infinitesimal quantity used, is not only absolutely harmless, but leaves no taste in the water, and with a few directions may be used by anyone to render an infected water safe for drinking purposes.

The writers have worked out a simple method which can be used by miners, prospectors, or campers, to purify immediately and on the spot any water which may be dangerous to drink. For armies in the field such a method will prove invaluable, for every soldier could easily carry a couple of ounces of lime and sterilise his own drinking water; hence the experience with enteric fever in South Africa need never be repeated.

The method is as follows:—

(1) Take a teaspoonful of chloride of lime, containing about one-third available chlorine, and remove the excess of powder by rolling a pencil or other round object along the top of the spoon, or by flattening it with a penknife blade, so that the excess will be squeezed off.

(2) Dissolve the teaspoonful of chloride of lime in a cupful of water, making sure that all lumps are thoroughly broken up, and to it in any convenient receptacle add three more cupfuls of water.

(3) Stir up the mixture, allow to stand for a few seconds in order to let any particles settle (this stock solution, if kept in a tightly stoppered bottle, may be used for four or five days), and add one teaspoonful of this milky stock solution to two gallons of the water to be purified in a pail or other receptacle. Stir thoroughly in order that the weak chlorine will come into contact with all the bacteria, and allow to stand for ten minutes. This will give approximately one-half of free chlorine to a million parts of water, and will effectually destroy all typhoid and colon bacilli or other dysentery-producing bacilli in the water. The water will be without taste or odour, and the trace of free chlorine added rapidly disappears.

The writers have followed this procedure repeatedly, using only the simple apparatus mentioned, consisting of a teaspoon, a cup, and a two-gallon pail. The water in the pail has been inoculated with typhoid and colon bacilli and examined before and after chlorination. The result was invariably the same—namely, that all typhoid and colon bacilli were destroyed.

We feel confident, therefore, that if the directions outlined are closely followed there will be a sufficient quantity of chlorine added to destroy practically all bacteria without adding any foreign flavour to the water. If the taste is present, the amount of stock solution added may be reduced until the taste just disappears without destroying the germicidal action of the chlorine.

Precautions are to be observed:—

Chloride of lime deteriorates rapidly when kept in cardboard packets or exposed to air. If fresh from the factory, it should contain about one-third available chlorine. Of six pound packages obtained at random from three shops, three were found of high strength, although the others would be suitable if more of the stock solution were used.

If the weak variety only is obtainable, then one and a half teaspoonfuls of the stock solution should be added to two gallons of water instead of one teaspoonful.

If the chloride of lime powder be kept in a tightly stoppered bottle, it will retain its strength for a long period. The prospector would only need to carry two small bottles—one for the powder and one for the stock solution.

It is very important that the stock solution should be thoroughly mixed with the water to be purified in order that no bacteria may escape the chlorine. The chlorine will not enter lumps or particles of organic matter, so that, if such material, or salt or mud, be present, it should be strained off or allowed to settle, and the water used for sterilising.

Water containing hydrogen sulphide must be given larger quantities of chlorine solution.

Chloride of lime is quoted in a Sydney wholesale druggist's catalogue at 16/- per cwt. in Sydney; in ½lb. bottles, well corked and sealed, 4d.; in 28lb. tins, 6/., and the same prices are no doubt quoted in Adelaide.

Why He Failed With Pigs.

Because his pigs lacked vigour.

Failed to provide ample range for the sows.

Had some litters arrive early in the winter.

His sows furnished scanty nourishment for their offspring.

His pigs took the scours from sleeping in cold, damp beds.

He did not attempt to provide natural conditions for the pigs.

Did not know that 70 per cent. of the pig's live weight is water.

Did not go after the vermin untill the pigs were completely lousy

Did not get the pigs out and compel them to exercise.

He had no method of ascertaining how much feed he was turning into pork.

He could not understand why half a dozen of his best pigs perished from sunstroke.

Did not know that the pig's stomach is small, and needs constant replenishing.

Never took the trouble to study the movements of the market throughout the year.

Boasted that his pigs could be grown on less water than any others in the neighbourhood.—American Exchange.

The Manure Heap.

Manure that has been carefully kept under cover and properly composted will show its effect almost immediately; but if it has been leached by heavy rains and exposed to drying winds and the sun's rays it will be of little value, although it may not be worthless as something of more or less value will remain, but whether it will pay for the labor and expense of hauling it is a doubtful matter.

All kinds of manure should be kept under cover to avoid heavy rains. A leakage here and there, or a little water on it now and then, is not a disadvantage, but by no means allow the manure to be soaked by drenching rains, for they carry away the most valuable portion of it. Prepare a suitable place for the manure, sloping towards the centre, and under cover.

First put down a layer of muck or forest mould over which place a thick covering of leaves, and then throw on the manure. From time to time let all the soapsuds and liquid manures be thrown over the solids. As soon as the manure has been placed on the heap, commence the process again with the dirt and leaves. If the leaves are not handy use waste bedding of the stables and pens.

Always finish by leaving the manure covered. Keep it damp, but in no case let it get drenched. Moisture, however, will assist decomposition, especially if the liquids of the stable are used. It will be an advantage to sprinkle the heap every day, or whenever the manure is thrown out, with dilutedsulphuric acid, which not only decomposes it and renders it soluble, but also converts the ammonia into sulphate of ammonia. Do not avoid the little extra labor, but take good care of the manure heap, for therein is the wealth of the farm.

Handling the Heifer Calves.

Upon the average farm and under the condition that generally prevail says "Farm and Ranch," more or less trouble is usually experienced in milking the heifer with her first calf. "Breaking" is the word generally used by the milkers to express the proper manner of teaching a heifer to stand still and submit to being milked the first time after the calf arrives. And it may be said that that word just about describes the operation if the animal has not been handled in any way for a year or so—in fact, since she was a little calf—but has been permitted to run wild during that time. When such is the case, as it usually is on the majority of farms, there is likely to be a disagreeable mix up between the young cow and her milker each time she is milked for a few days.

Now, I know from some experience that much of the trouble and annoyance experienced at that time can be avoided. How? you may ask. Simply by getting on friendly terms with the heifer calves while they are yet young, and then handling them as frequently as can be done conveniently from that time until their first calf is dropped. I am sure that this procedure is better for all concerned. Train the calves for their future duties just as colts are trained for their future duties. Accustom them to being handled. In other words, "break" the heifers as they are raised.

If one will adopt a gentle, caressing manner while they are yet young most heifer calves will soon become gentle enough that a person can approach them, even in the pasture field, without their running off with a snort, and rub their backs and sides and even handle their little udders and teats.

It has been claimed by some authorities that this handling of the udder and teats is beneficial to these organs, developing them much the same as exercise develops the muscles of the human body. Even though this be not true, the heifer is being accustomed by this process to having these organs handled, and so it is very unlikely that such a heifer will attempt to make much trouble when milked for the first time. This operation is usually more dreaded rather than relished. But the work of training the heifers while they are young certainly need not be regarded as particularly disagreeable work.

The Art of Milking.

To a man brought up in a dairy county and used to cows from childhood, milking seems such a simple operation as scarcely worth writing about (says a correspondent of the Farmer and Stock Breeder). Yet, in judging agricultural labour competitions, I see scores of milkers in a year, and very seldom a really good one. A short time ago there was a silly discussion in one of the daily papers as to which was the proper side to milk the cow from. There is no proper side except the outside. It is merely a question as to which the cow is accustomed. Anything strange upsets a nervous cow, and to sit down on a side she is not used to may mean a semicircular sweep of the leg and a sprawl on the floor. In England we usually milk from the off or right hand side. In the North cows are oftener milked from the left, and it matters as little as from which side a lamb sucks. Milking is one of the most important operations on a farm, and nowhere is the presence of the master more needed than in the cow byre. There should be no talking, which means stopping to listen, and a check of the flow of the milk. There is one rule with dairy cows which should never be broken—absolute quiet. Dhere should be no racing with a dog when the cows are being brought up from the field. They answer well to the crack of a whip,

and it comes in useful when a spiteful master-cow stands in the gateway or narrow lane and gores at the rest as they pass—a by no means infrequent trick. Cows should never be hurried through gates, which often cause hips to be knocked. A pail of water and a cloth should be taken into the shed, and each cow's udder well wiped with the damp cloth, also the flanks and part of the belly, to remove all loose hairs. A milking stool should be 14in. to 16in. high, according to the size of the man. A lower one puts one too much at the mercy of the cow, whilst a high one cramps the arms and shoulders. A three-legged stool accommodates itself best to uneven surfaces. I perfer the sloping milk pails, without the ordinary bucket handle, which are made simply for the purpose, and can be used for nothing else. Our grandmothers knew nothing of microbes and pure cultures, but they used to dip tins in boiling water and hang them out in the snn just as if they did.

Manuring Pastures.

Among the longest carried out experiments in the manuring of pastures are those under the direction of the Agricultural department of the Armstrong College, Newcastle-on-Tyne, at six centres in Cumberland for thirteen years, at three centres in County Durham for six years, at Broom haugh, Northumberland, for thirteen years, and at Cockie Park for eleven years. Professor Gilchrist, in reporting and commenting on the results obtained, observes that they indicate :—

(a) That on heavy soils, phosphatic manures only are as a rule most profitable for old pastures.

(b) That on the lighter classes of soils, a potash manure should be added to the phosphatic manure.

(c) That in the long run nitrogenous manures, either alone or in combination with other artificial manures, are not likely to be profitable for old pastures.

(d) That on heavy soils phosphatic manures will develop clover plants and leguminous herbage, and that the same manures with a potash manure will develop the same plants on the higher classes of soil. These plants collect nitrogen in large quantities from the air, by means of their root modules, which is likely to be much more valuable than nitrogen in the form of nitrate of soda or sulphate of ammonia applied to old grass land.

(e) That basic slag (Thomas phosphate) is likely to be the most effective phosphatic manure, especially on heavy soils, although bone meal may give excellent results, but this manure is slower in its action than basic slag. Neither superphosphate nor dissolved bones have given anything like so satisfactory results as the two foregoing phosphatic manures. The great bulk of soils experimented on are poor in lime, and this perhaps explains the poorer results from the latter manures.

Summarising Conclusions.

The experience obtained from these experiments enables the following suggestions to be made for the manuring of old pasture lands :—

1. On soils in poor condition a dressing (per acre) of 10 cwt. high class slag with, on the lighter soils, the addition of 2cwt. muriate of potash (or about 6 cwt. kainit) is likely to be very generally useful. If farmyard manure has been used on the lighter soils, however, the potash manure can probably be omitted. For the after treatment of these soils, in better condition, the application of about 5 cwt. per acre basic slag of best quality every three years, with the addition of 1cwt. muriate of potash on lighter soils, is likely to give good results. If farmyard manure is available, 10 tons manure and 10 cwt. slag is a good first dressing per acre for poor soils, and this may be followed with the same dressing of farmyard manure every third or fourth year, and a dressing of 5 cwt. basic slag of good quality every three years. For soils rich in lime, superphosphate may be preferable to basic slag.

2. Basic slag and the potash manures will give the best effect if applied early in the winter. The distribution of all the manures must be perfect, and they should be well harrowed in, especially if the herbage is at all coarse. It is advisable that when the turf of old grass fields become matted, it should be grazed for one or more years with cattle as this class of stock is most effective in treading down turf; such land is also greatly improved by harrowing in spring with heavy harrows. It is desirable also that the aftermath of old pasture when cut for hay should be grazed and not mown, as the former does much to keep the turf in fine condition.

3. On the whole, neither crushed lime nor common lime have given anything like profitable returns, even several years after their application; in fact, these experiments indicate that basic slag is really the best source of lime for this purpose, and that it owes its good effects to the lime as well as ta the phosphates that it contains. Half a ton of basic slag contains as much lime—partly free and partly in combination—as is contained in quarter of a ton of crushed lime. The fineness of grinding of slag undoubtedly increases the effectiveness of the lime as well as of the phosphates it contains. It it, therefore, suggested that for most soils, the use of basic slag makes the application of either common lime or crushed lime unnecessary for old hay land or for pasture. It is only soils of a peaty character, or those with a good deal of rough, matty herbage, or some organic matter, that are likely to give a return from lime. Slag generally supplies the lime requirements of all except this class of soil with more profitable results. The results of some experiments elsewhere have indicated that lime adhed to slag diminishes the good effects of this latter manure.

Raising Young Heifers.

An article in the "Leader" on this subject has suggested to a practical contributor a description of his experience.

One question, he remarks, is, How much milk does it require to raise a heifer calf into a profitable dairy cow? And his experience is that the young heifer calf, with little, if any, milk after two weeks of age, and not a drop after one month, will make a more profitable cow than if allowed all the milk it can consume in the early stages of its existence. If she is allowed to have all the good milk she can consume, and in addition is fed on hay and linseed meal, she will store up too much fat. And every practical dairy farmer knows this is always done at the expense of the milk flow. If, on the other hand, we feed on foods rich in protein, foods that will make muscle and sinew, growth only, and not fat, we shall be starting in the right direction. This can be done by those who sell all their milk from the farm daily as cheaply as by those who make butter and have an abundance of milk; and the most profitable animals in our dairy are those which have had but little milk till they were two weeks old, and not any after the first month.

Our plan is to remove the calf from the dam as soon as the milk is fit to use, and give it, for the first week (or until it has forgotten its mother and has learned to drink well), from one to one and a half quart of its mother's milk, according to size of calf, thrice daily, being careful never to overfeed it, keeping it a little hungry rather then otherwise. In a week or ten days reduce the milk and add gruel made of wheat flour and linseed jelly, gradually increasing the gruel and decreasing the milk, until at three or four weeks of age you can dispense with milk entirely. This linseed jelly is made by boiling whole linseed in six quarts of water over a fairly slow fire, until all the water is absorbed, and when cooked it will be in a thick jelly.

Make the gruel by damping from two to three tablespoonfuls of flour, and then scalding it; while scalding it, add one or two tablespoonfuls of jelly, and there remains a rich gruel, which can be thinned to the consistency and temperature of new milk. This is greatly relished by the calf. Increase the amount of flour and jelly as the calf increases in size and age. If one can conveniently make hay tea with which to scald and thin this gruel, it will be all the more relished by the calf, and will make her grow the faster. Our experience is that we would rather have this to raise a dairy heifer than the richest of milk. To make it, place some good sweet hay in a boiler, fill it with cold water, and place it on the back of the kitchen fire, and let it steep all night, and you will have a rich tea that will contain all the aroma of the hay. This system of feeding, by being careful not to overfeed, will give the calf a tendency to eat hay and other feed quite young. This it should be encouraged to do by giving it free access to good hay.

Shortly after the calf begins to eat hay, it will also eat feed if placed in a box where it can reach it. This should be composed of 4 lbs. of wheat bran, 4 lbs. of crushed oats, and 2 lbs. of linseed meal, giving the calf all it will eat clean at each meal, and after it eats this readily, the jelly may very largely be left out of the grued; yet it will do no injury to continue with both. At the age of three months the gruel can be entirely dispensed with, feeding only on the hay and protein foods, or good pasture if in season, with pure water to drink.

Calves fed on this system, particularly in the winter, will not present a very handsome appearance, rather inclining to be pot-bellied; and in winter, from the lack of fat, nature places upon them long hair to keep them warm, which also detracts from their beauty; yet this calf is the kind that will make the profitable dairy cow.

After reaching the age of a year or more this condition will gradually leave her, and she will begin to assume the shape of the dairy animal. The pot-bellied condition disappears, and she has stored upon her system not fat, but flesh and muscle, which she will need to draw on after her dairying work begins. Let this heifer begin her work at the age of 20 to 24 months, feeding her well when not on pasture or dairy foods, with no fattening ration and one month before she is expected to drop her calf, unless upon pasture, feed her two quarts per day in connection with her coarser foods of hay and fodder, of the same mixture of oats, bran and linseed recommended for the calf, which will distend and develop the udder and encourage large capacity for milk.

Food and Butter Fat.

Fifty years ago milk was supposed to be formed from the blood of the animal, and the protein and fat present were considered to be formed direct from the protein and fat in the food it was possible to increase the fat in the milk. One of the first to dissent from this view was Kuhn, who, in 1869, stated that the percentage of fat in the milk depended upon the cow alone, and could not be altered by changing the ration. A few years later he recanted, but the question was taken up, and has been attacked by an enormous number of investigators since the introduction of the Babcock and the Gerber tests has made milk analysis a simple matter. It is now known that many of these experiments have little or no value; trials with only small numbers of cows lasting only three or four weeks must be regarded very doubtfully. Without going into the history of the question, it may be said that the best results all showed that the percentage of fat could not be permanently altered by change of food provided the animal remained in good condition. Perhaps the most reliable experiments are those made at Copenhagen, and they have been so admirably conceived, and so well executed, that we may profitably spend a short time discussing them.

The experiments are carried out by members of the Copenhagen Laboratory staff on farms where 150 or 200 cows are kept. Forty or fifty young cows which have recently calved are selected and arranged in three groups in such a way that for any cow in one group there are in the other two corresponding ones so far as age, weight, milk yield and quantity of milk are concerned; only 30 are actually wanted, and there is consequently an ample margin to allow of the rejection of unsuitable animals. The first or preliminary period of the experiment lasts one or two months: during this

ıe the three groups are all kept the same ration, which includes two foods that are going to be ed, and the milk is duly weighed l aaalysed. Then begin the experiats proper. One group keeps as near possible to the ration; the second up receives a larger quantity of one food under trial and none of other, while the third group reves a larger quantity of the latter l none of the former; but the rest the ration is the same for all. For other one or two months the milk weighed and analysed each day. In third or final period the animals back to the same ration, and the lk is weighed and analysed daily a further one or two months. e trials are carried out on about ht farms for two years. They are n considered complete. 2,000 cows re used for these trials. The eral results showed that as regards antity of milk produced 10 lbs. of nish mangolds were equivalent to lbs. of hay, or 1 lb. either wheat, eat offal or maize, all of which re equal; but the best results were ven by cake, especially if mixed th a suitable quantity of roots. ange of ration had, however, no preciable effect on the percentage of or total solids.

Misfits in Horses.

Many breeders who have studied the estion of breeding—whether draught light horses — must have come ross the word 'misfit.' Indeed, thing can be as certain in horse eeding as the production of misfits. ıe first thing a man should ask ıen he starts to breed, no matter hat class of horse it may be, is—What am I to do with my misfits?' r if breeding is not commenced and rried out on systematic lines, there no mistaking the fact that this tle word 'misfit' will, and must , a source of great trouble, whoer the breeder may by. If, indeed, ese could be disposed of at cost ice or a little over, the problem of ofitable horse breeding would be lved. This 'misfit' exists, and everydy is always ready to suggest that mebody else should buy him at a ir price, and relieve him of the ırden. There is no end to the cupations he is suited for in the inds of those who do not want m. In spite of the versatility of e 'misfit' he remains a millstone ound the neck of the breeder. There one thing he can do, and does— eats up the profits of his owner, r the 'misfit' is whatever other ualities he lacks, always a good oer. On the whole, however, it ems desirable to reduce the producion of an animal for which the deand is so uncertain, to the smallest ossible number. The true solution of he 'misfit' difficulty is not so much ow to sell him but not to breed im. I think that in this way there till remains a great deal to be done. Horse breeding is, and, to a certain extent, must remain, uncertain until we have mastered the laws which govern it; but there are two causes of 'misfits' which are, to a certain extent, within our control. These causes are overtaxed stallions and wornout mares. If there is one thing which science has taught us more clearly than another, it is that parents in full strength and vigor are more likely to stamp their own best qualities on their offspring than animals in a weaker state, because it seems as if when one (or both) parents is below the mark in age, health and vigor, the tendency is for the offspring to revert to the type of some unknown and, it may be less desirable ancestor. We hear a great deal about the advantages of the Arab cross, and of the hardihood and soundness of some Eastern horses, but many of the qualities we admire are, in fact, the result of breeding on sound principles, and rearing the colts in a suitable climate. Thus while we may not be able to exclude 'misfits' altogether, yet we can reduce the number by carefully excluding the causes of their appearance. It is not enough to say that breeding horses is a matter of chance or luck. There is no doubt an element of the unknown and uncertain; but we can, at all events, do our utmost to reduce the chances against success to a minimum, and this we certainly have not done yet.

Curing Bacon and Hams.

The following is a celebrated family receipt for curing "Willesley hams":—To a han of about 18lb. weight put 1lb. of bay salt, ½lb. of common salt, 2oz. of saltpetre, 1oz. of black peppercorns. These ingredients should be mixed together and pounded well. When the ham has first well drained for a day or two rub it well with the above mixture, and let remain in the mixture for four days, rubbing well every day, and turning it over so that one day the top or skin lies on the mixture and the next day the under or cut side lies in it. Then put upon it 1½lb. of good brown treacle, still leaving the other mixture with which it will mingle. Let the ham lie in the mixture one month turning it every day. Then hang it up to dry. A kitchen where there is no gas, as in country houses, is the ideal place to dry these hams. A dry passage will also be found suitable, as if hung in too warm a place the delicious fat will waste. When quite dry the ham should be put into a bag made of unbleached calico and hung up again. These hams are ready to eat at six months from the time of curing, but the climax of the flavour is obtained at two years old Hams cured in this way should not be soaked before cooking, only washed or brushed in warm water.

Curing Bacon.

Bacon can be cured in two ways —by dry-salting or brine curing. The former is most generally adopted. To make bacon by the dry process, equal quantities of the best salt and brown sugar are used, with ½oz. of saltpetre to each pound of the mixture. This is thoroughly rubbed into the pork every second day for a week and the meat turned at each rubbing. The meat is laid on a stone floor or slab, ham upon ham in a pile, and after the first week turned and rubbed about twice in four weeks. After this the hams are hung up to dry in a cool, well ventilated room, and finally smoked. Hams lose about 20 per cent. of their weight in curing.

For brine curing a series of tanks are necessary, the bacon being shifted from one to the other for about seven days, when it is taken out of the brine and stacked in dry salt on the floor for the space of about three weeks. The bacon can then be washed and smoked, or hung up in the green state until required. For hams the same process is followed, with the addition of rubbing the face of every ham with brown sugar before covering with salt and saltpetre before laying out singly in the rows on the floor. Keep them well covered with salt for a week then brush clean and stack them for three or four weeks, giving the hams a good pressing. When washed and soft the hams are batted into shape, and they are then ready for smoking. After smoking, and if charcoal is used for packing a layer finely powdered should be placed over each layer of the bacon.—Exchange.

Hard Milking.

Hard milking in cows or heifers can be positively overcome in a short period of time and in a very economical way (not by the using of the milking tube) but by the use of the teat plug.

The teat should be washed with an antiseptic solution, the teat plug should be dipped in a like solution, then into a little ointment and passed into the points of the teat. Being self-retaining it should be permitted to remain in the teat from one milking to another. In this manner hard milking can be made a thing of the past.

Changing the Coat in Spring.

Whilst horses are changing their coat in the spring season, they are not as a rule quite up to the mark as regards their working capacity. The process of shedding the winter coat and growing the summer one entails a certain drain upon the system and tends to debilitate the horse for the time being, impairing its working powers and its condition. For this reason it is desirable, and certainly advisable, to bestow some extra care and attention on the horses when they are undergoing change of coat in the spring. The diet may with great advantage be somewhat improved during this period, and the daily ration of corn may suitably be slightly increased.

Carrots are an admirable food for horses while they are shedding their winter coat, helping to "loosen the coat," as the saying is in stable parlance, and if there is the opportunity of doing so, a daily allowance of these roots should certainly be fed, as they will help to improve the condition of the horses and serve to facilitate the coat-changing process. Though they are not by any means equal in value to carrots for horse-feeding purposes, mangels are very useful, their effects being similar to, but less pronounced than, those of carrots. Parsnips are also a satisfactory substitute for carrots.

The feeding of a little linseed meal may often prove of benefit when horses are changing their coat, and a daily allowance of from half a pound to one pound of it may be included in the bill of fare with advantage, if the condition of the horse is not as good as it might be. In the case of cart-horses, linseed cake can be fed instead of linseed meal; it answers the same purpose as the latter, and is, of course, considerably cheaper. In order to obtain any appreciable effect with linseed cake in the way of improvement of condition, etc., at least a couple of pounds daily must be fed, and up to three pounds may be given if desired. The beneficial effects of both linseed meal and linseed cake are in a large measure due to the oil which they contain. During the coat-changing process, linseed mashes or linseed and bran mashes may suitably be substituted for the usual bran mash.

Seeing that horses are not as fit as they ordinarily are while they are changing their coat in the spring, and that they are not fully up to their work, they should be saved as much as possible whilst being worked during this period, and care should be taken not to work them too severely.

The exact time when a horse begins to shed the winter coat, of course, varies somewhat in different cases, some horses changing their coat earlier in the season than others, while some are particularly late in doing so. High feeding and heavy clothing as well as a hot stable all tend to bring about an early shedding of the winter coat. The nature of the season also to some extent influences the changing of the coat; thus a mild and forward season favours an early change, while in a backward and cold spring it is retarded and occurs somewhat later. A cold stable also tends to retard the coat-changing process, and illness has a similar effect. Horses which are in poor condition from some cause or other are usually found to be late in shedding the winter coat. Stabled horses which are well fed and warmly housed generally commence to change the coat earlier in the season than horses that are turned out, and the former also complete the process more rapidly than the latter.

There are many grooms who hasten the shedding of the winter coat by extra grooming and by hand-rubbing the coat and forcing of the hairs—sometimes even resining the palms of the hands for this purpose. This practise of accelerating the shedding of the hairs by mechanical means is a bad one and should be discouraged, as it tends to spoil the appearance of the summer coat, owing to the latter being prematurely exposed. The coat-shedding process in the spring should in no wise be duly accelerated if a perfect summer coat is wanted, and excessive grooming and any forcing off of the hairs must be avoided. There is certainly no need for the latter, as the winter coat in a healthy horse which is in good condition is shed quite rapidly enough, and comes away easily and readily of its own accord.

In cases where the coat-changing process goes on unusually slowly and occupies a much larger time than is generally the case—as often happens when a horse is in poor condition—it can be expedited by liberal feeding, and by including a goodly allowance of linseed meal or, where cart-horses are concerned, linseed cake, and plenty of carrots in the daily bill of fare. Warm clothing also serves to accelerate the shedding of the winter coat.

Selecting a Bull.

THE GOOD SIRE PAYS.

As a rule, less attention is given to selecting a bull than a cow. There is a very general desire to possess superior cows, but judging from the fearsome-looking specimens one frequently sees doing duty as a bull it is quite evident that there are plenty who do not care one half-penny what breed, form, size, and other points it owns, so long as it can do its work. This is an extremely unfortunate attitude, and when put in practice, as it far too often is, it is quite certain that future stock produced from such will be of an inferior character. It is here the mistake becomes conspicuous, and it is more felt later when the progeny is marketed. Superior cows are very desirable, but a first-rate bull is more so, and it ought to be the ambition of all to own such, not only as a credit, but as a money maker. A cow may be as good as is possible, but put her to an inferior bull, and her calf will be, to say the least, moderate, but use a substantial bull, and ninety-nine chances to one the calf will be better than either the sire or dam. Attempts to breed from a poor class of cow with a bull of a similar type only results in the production of a lot of weeds, but if a really good bull is used for inferior cows the stock will be improved perceptibly both in appearance and value. Of late bull sales in England have been frequent.

Question about Pigs.

Reply to "Farmer," Mt. Gambier.—Your question is not sufficiently definite to permit of our advising you with any certainty, that such advice would be helpful. We strongly recommend you to get the book, "Pigs and their Management," Mr. H. W. Potts, in which you will find a great deal of valuable information on all matters relating to pigs. Housing, feeding, crop rotation, etc., are all freely dealt with. We are sure you will find the book of much service. Send three shillings and eight pence (3/8) addressed to Government Printer, Sydney, and you will receive the book by return mail.

Poet: I called to see if you had an opening for me. Editor: Yes; there's one right behind you. Shut it as you go out, please.

Flies in the Dairy.

FORMALIN AND HOUSE FLIES

(From the "Tropical Agriculturist.")

The use of formaldehyde (or formalin), as a deterrent against house flies, has been recommended —from time to time—for some years. The simple exposure of dishes containing dilute formalin was said to drive away every house fly from the premises, and the success of this treatment has been vouched for by various persons. I must confess, however, that my own experiments with dilute formalin have been uniformly disappointing. Whether our Ceylon fly is a more hardy race, or whether our warmer climate has a weakening effect upon the action of formalin, the fact remains that I have never been able to record the slightest success with this simple treatment.

But if the house fly can be induced to swallow even a weak dose of formalin, it is certainly fatal to that insect. It does not find plain formalin and water sufficiently attractive; but formalin mixed with sugar or milk, in judicious proportion, is readily imbibed by flies—with fatal results. One method is to fill a soup plate with damp sand, place a disc of blotting paper on the sand, spread the paper with sugar, and sprinkle the sugar with dilute formalin—in the proportion of one part to twenty of water. As commercial formalin is of the strength of only 40 per cent., this dilution represents a mixture of about 2 per cent.

The Journal of Economic Entomology for October, 1911 (Vol. 4, No. 5) publishes an article on "Formalin for Poisoning House Flies," by R. I. Smith, of the North Carolina Experiment Station. Mr. Smith set himself the task of freeing a college dairy from a plague of flies. Of the condition of affairs before the treatment he remarks :—"In the milk room the flies covered the walls and ceiling, and the straining cloth at milking time was actually black with flies." He continues : — "My first experiment proved successful. This was the addition of 1oz. of 40 per cent. formalin to 16ozs. of fresh milk. This mixture was placed in four shallow tin plates and set on the floor of the milk room about 3 o'clock one afternoon. The flies commenced to feed and die within a few minutes, and continued to die even while the evening's milk was being brought in and strained. These plates of poison were left over night, and the milkers advised me that the flies were feeding greedily the next morning soon after daylight. The dead flies, swept up about 8 a.m., measured about one pint, representing full 5,000 flies."

"This experiment was repeated for three successive days, and about one pint of dead flies were swept up every morning. In addition to the flies actually secured, many dropped dead outside the windows.

"My next experiment was to use a mixture of half milk and half water instead of whole milk. Formalin was added in the same proportion, 1oz. to 16ozs. of diluted milk. This proved to attract the flies as well as the whole milk.

"Several variations in the proportion of formalin and milk were tested, but my conclusion is that the use of 1oz. to 16 is most effective. The following method of stating the formula has been used for newspaper articles, in order that every housekeeper can prepare it easily—1 oz. (two tablespoonfuls) of 40 per cent. formalin; 16 ozs. (1 pint) of equal parts milk and water. This mixture should be exposed in shallow plates, and by putting a piece of bread in the middle of each plate, it furnishes more space for the flies to alight and feed, and in that way serves to attract a greater number of them. Whole milk can be used, but the diluted milk seems to be just as successful.

"A very conclusive test of the efficiency of the above formalin mixture was made in a large calf barn where flies were extremely numerous. Six plates of the mixture were placed in the passage way between the stalls. This passage is about 6ft. wide and 120ft. long. The poison mixture was exposed at 12 o'clock noon, and left until 8 o'clock the next morning. The dead flies when swept up measured three quarts, and certainly one-half as many died in the stalls on each side. I estimated that we killed between forty and fifty thousand flies in twenty hours by this experiment.

"At the writer's suggestion many housekeepers have used the formalin as recommended above, and several have reported the killing of flies by the pint and quart. A gentleman in charge of a farm, where a large horse barn is main-

tained, tells me that he poisoned a gallon of flies the first day he tried the mixture. This statement was vouched for by other witnesses in whom I have perfect confidence.

"A good place to expose the formalin mixture is on the front and back porches, where flies are frequently numerous and waiting to enter when the doors are opened. I know of several people who have used it successfully in this manner.

"The use of the formalin-milk mixture in dwelling houses has not proved so successful, except in unscreened kitchens or dining rooms.

"This poison was tested in the large College mess-hall—where over four hundred students can be seated, resulting in practically cleaning up all the flies in two days. Previous to that time the steward had been using tanglefoot fly paper, often having as many as thirty sheets exposed. Fully that number were present when the formalin was used, but in spite of them the flies were numerous."

I have satisfied myself, by actual experiment, that our Ceylon fly is not proof against this mixture. Sweetened condensed milk was employed in place of fresh milk, and proved to be very attractive. Flies that fed upon this mixture died very quickly—certainly within two minutes.

Though so rapidly fatal to house flies, formalin mixed with syrup was eaten by various kinds of ants with impunity. Ants that had partaken freely of poisoned syrup were still alive and apparently in good health after twenty-four hours.

In recommending this treatment, I wish is to be clearly understood that it should only be accessory to measures of strict cleanliness. Flies breed in filth, and where filth is allowed to remain, fresh broods will constantly replace the victims of the poison. The formalin treatment is merely a palliative to destroy existing flies in a building.

A Sheep Farmers' Silo.

The best stock authorities of Australia are preaching ensilage—ensilage—ensilage—every time. Exhaustive experiments have been conducted in New South Wales for some years, and the results published. Amongst other interesting facts recorded, it has been shown that, for fattening purposes, ensilage is quite as good as green grass—that while hay alone causes serious losses in breeding ewes or cows when their time is come, ensilage is as good as natural pasture; that it is the cheapest fodder known, and the least liable to destruction or deterioration.

In regard to its use by sheep farmers especially, the Agricultural Department of New South Wales published the following re cost of feeding on ensilage made from natural growths:—

"While there is any dry feed about, a ration of 1 lb. per day will be quite sufficient for sheep; but, as the dry feed disappears, it will be advisable to gradually increase the ration to 3 lb. per day. At these rates 1 ton of silage will give a daily ration of 1 lb. to 2,000 sheep, allowing a fair margin for possible but not probable waste, while 3 tons will give a full daily ration; the cost for silage being 2s. and 6s. per day respectively at the pit, which is surely a small sum, and particularly so when it is remembered that, in drought time, if chaff or hay can be obtained at all, £8 per ton is considered very reasonable, and that dry feed is not nearly so suitable either for breeding ewes or milch cows as silage. In fact, once green feed has disappeared, there is nothing within reach of the sheep farmer which approaches silage as a cheap and satisfactory food for sheep. It may be as well to emphasise the fact that this silage is made from natural growths—viz., herbage, thistles, etc.—unaided by irrigation or any artificial means."

Thus the Agricultural Department of New South Wales. Coming to our own State, I witnessed the erection and filling of a silo, which proved to be perfectly effective, on Mr. E. Graham's holding, Manapouri, on Pilton Estate, Greenmount writes the Queensland Agricultural Gazette. This silo cost, material and labour included £9 18s., and the 64 tons of ensilage put into it cost slightly over 4s. 6d. per ton. Mr. Graham is a feeder of sheep, hence the interest to other sheep farmers of his operations, which I proceed to give in detail.

Most silos cost at least £1 for every ton capacity, and require skilled labour and expensive materials It is doubtful if the regulation silo can be built on the Downs, under present conditions, at less than 25s. per ton capacity.

The crop was maize, sown broadcast on 8 acres. Owing to the dry time, it was plain to the manager that it would come to nothing as far as grain was concerned. It was comparatively stunted; in some places not more than 3 ft. high, and the rest not higher than 6 ft. It was light in the stalk, and only sparsely furnished with immature cobs. A 6-h.p. steam engine was hired, and also a cutter and blower of American make. The cost of erecting the silo as furnished by Mr. F. Reams (Mr. Graham's manager) was as follows:—

MATERIALS AND LABOUR.

	£	s.	d.
10 Poles, 19 ft. long, 8 in. at big end, at 10s. each	5	0	0
10 Fencing posts, 6 ft. 6 in. long, at 6d. each	0	5	0
230 Feet, wire netting	1	10	0
Fencing wire, bolts, and sundries	0	10	0
Labour of 3 men for 2 days, at 5s. per day, with board and lodging	2	8	0
	£9	13	0

COST OF MAKING ENSILAGE.

	£	s.	d.
8 Men for 3 days, at 5s. per day.	6	0	0
1 Engine driver, 3 days at 10s. per day	1	10	0
Food for 8 men, at 14s. week, for 3 days	2	8	0
Hire of engine, 3 days, at 10s. per day	1	10	0
Hire of blower and cutter, at 10s. per day	1	10	0
Binder twine	0	2	0
Sundries not enumerated	1	0	0
Wood for engine 1 cord at 7/6		7	6
	£14	7	6

When the last sheaf was cut and blown into the silo, it was estimated that not less that 64 tons of ensilage had been manufactured.

The cost, therefore, of making 64 tons of ensilage, works out at about 4s. 6d. per ton. Truly a cheap food for stock if 4 lb. be a full ration for a ewe and lamb.

METHOD OF BUILDING.

A circle was made 18ft. in diameter, and at regular distances ten holes were sunk in the earth to a depth of 3 ft. In these holes the fencing posts were placed, and well tamped in. The 19-ft poles were placed beside the posts, about 6 in. in the ground, and on the inside, facing the centre of the circle. They were firmly fastened to the posts by ½-in. bolts, two to each pole. Then, at distances of about 3 ft. apart, holes were bored in the poles, and ordinary black fencing wire drawn through. Then

the wire netting was attached to the poles on the inside, as high up as was deemed necessary for the estimated amount of available crop.

An ordinary reaper and binder was used, and it was found that instead of two wagons sufficing to keep the field, the machine, excepting when it broke down on one occasion, was always ahead of the wagons.

Similarly, the machine could not get enough material to work at full capacity. Two wagons extra would be required to keep up a full supply of maize. Only straw was placed on the earth, and the blower was placed at its greatest extension, and was not shifted at all afterwards. A drain was dug around the silo after it was filled.

For roofing purposes, about 1 ton of weeds and rubbish was chaffed up very small and blown on to the top of the silo stack (the centre of which was raised) to a depth of about 4 in. over all. On top of the chaff was placed about 1 ton of long firewood set with ends at the centre and circumference of the ensilage. Any person whatever can build a simple affair such as this, and, if he keep sheep, will be able to smile at a dry time. Ten acres of maize, grown in a good time and put into such a silo, means quite 150 tons of ensilage, and 100 tons of ensilage will keep at least 600 sheep for 150 days at a cost of less than £40, inclusive of cultivation.

Several keen practical farmers who came over to see this silo were enthusiastic as to its possibilities.

Of course, the method as compared with the more permanent silos is somewhat crude, yet these cheap silos may be improved upon without any serious addition to cost. For instance, after a few feet had been chaffed into the silo, Mr. Reams thought that it would be an advantage to put something on the wire netting to keep out air. He caused a number of stalks of maize to be interlaced, and the result was that an almost air-tight surface is presented wherever that method was applied.

For the coming lamb-raising business on the Downs, it will be necessary to keep the ewe and lamb without a check. With this cheap and handy method there can be no excuse for a man having to "hold over" his lambs through a bad time.

Messrs. Graham and Reams are to be congratulated upon their wisdom and enterprise in showing the way.

Clearing Land with Dynamite

Mr. R. B. Howard, Chief Protector of Aboriginals, writes as follows on the subject of "Clearing Land with Dynamite" to the Queensland Agricultural Journal:—

For some years I have been using dynamite on my farm for purposes of clearing the land of timber, for subsoiling, and also for draining. Thinking perhaps a description of the methods employed may interest some of your readers, I am now sending a few notes which you may deem desirable to publish :—

In clearing land of stumps or trees, a charge of dynamite is placed under, not in, the stump, by boring a hole with a 1¼-in. shell auger on three sides of the tree or stump to be operated upon. The holes are bored at an angle of, say, 45 degrees, with the object of bringing the bottom of the holes as closely together as possible, the depth of each hole being about 3 ft. The size of the stump will regulate the charge. For a stump of 18 in. in diameter I would use four cartridges in each hole—that is, twelve altogether. When charging, I always split the paper wrapper of the cartridge on two sides and place one cartridge at a time into the hole carefully squeezing down with a wooden rammer. Only one cartridge is primed with detonator and fuse. This cartridge is, of course, not cut. When the holes have been charged and tamped, the fuse is fired, and the concussion in one hole has been found sufficient to explode the others. It will, of course, be understood that the bottom of the holes must not be more than, say, 8 or 10 in. apart.

This method of clearing land I have found a good deal more preferable and less costly than pulling stumps or trees with a machine, and I estimate you can blow up fifty stumps in the time it would take to remove one or two under other methods.

The effect of the dynamite is to split up the stumps, remove all soil sticking to the roots, break all the main roots, and loosen the soil for yards round; and the stump burns readily. Moreover, one man can do all the work.

In the ordinary cultivation work I have found dynamite most useful in almost every class of soil, but more especially where a substratum of clay is in evidence. By drilling or boring with an auger holes 20 ft. apart to a depth of 3 ft., and charging each hole with three plugs of dynamite, it will be found, after explosion, that the subsoil is fractured, for a radius of not less than 10 ft. from each hole, to a depth of about 4 ft. It would be quite superfluous for me to point out to the agriculturist the value of such an effect on the soil.

Again, where an orchard shows signs of decay, which so often the case with citrus orchards, the effect of dynamite blasting gives marvellous results, the trees in a very short time regaining their vigour and showing laxurious growth.

In fact, from the experience I have gained in using dynamite, I am strongly of the opinion that, were its value as an adjunct to farming more generally known, it would come into general use. The cost compared with other methods has also to be considered; and when it is pointed out that 1 acre of land can be efficiently subsoiled—more so than by any other means—for a sum less than £5, the value of the operation is apparent.

In my own case I have just treated about 2 acres of land in which ornamental trees had been planted, but, although about three years old, the growth was stunted and altogether unsatisfactory, owing to a cold impervious white clay underlying the few inches of top soil; and I am satisfied these trees will now make a good growth. Again, I have also treated my orchard in a similar way, and the result has already been very satisfactory.

The general opinion appears to be that dynamite is exceedingly dangerous to handle. Well, Mr. Editor, so is a gun if placed in the hands of a careless person. My sons and myself handle dynamite constantly without the slightest fear of an accident; and, if the same care is exercised as would be in the case of a loaded firearm, there is little or no danger—in fact, a pea rifle in the hands of a young lad is far more dangerous than a ton of dynamite under the care of a responsible person.

Docking and Castration.

The best time to docks lambs is to do it at the right time, whether one employs the chisel and mallet, hatchet and mallet, knife or hot pincers for instruments. Any of these instruments will give good results and influence the growth of the lambs very little if employed before the lamb is over 10 days or two weeks of age. However, if the lamb gets four or six weeks of age, docking may be resorted to, but danger from bleeding to death or interruption of growth may be expected.

To dock, one man should hold the lamb by its hind legs, back downward, and with its tail laid across a block he should draw the loose skin about the root of the tail toward the body of the lamb while another cuts the tail off with a chisel and mallet. If a knife or hot pincers are employed the block is not necessary. The stub should be about 1½in. or 2in. long. So soon as the tail is removed the skin should be let loose which then slips back and partially covers the stub.

The lambs as they are docked should all be turned into a pen by themselves where they can be looked over every 20 minutes or so for a couple of hours, so as to give aid should any need it to prevent their bleeding to death. Should any bleed hard after ten minutes the stub may be ligated with a piece of twine, or a

red hot iron may be used to sear the wounds. Where lambs are permitted to go undocked until quite large, the twine ligature should be put on what is to be the stub before the tail is cut off. Then after the blood has clotted for two or three hours the string may safely be removed with a knife.

Castrating the lamb should be performed before the lamb is more than 14 days of age. It may best be done when the tails are removed for the lamb is in hand and can be looked after for both operations after the work is completed. Upon the range these operations are always performed together and the per cent. lost is indeed smaller than when operations are performed different times. It is said that the inflammation thus caused at the two points is less than where but one point is injured at a time. This is hard to prove, but results seem to indicate that this is true. The operation in castrating is very simple. One man should hold the lamb with its back toward his breast and a hind leg in each hand. The operator should then cut off the lower one third or one-half of the scrotum. Then after pressing the testicles out of their enclosure with one hand, with the other take hold of one and then with the knife free all the membranes adhering to it. Then draw the testicle out until at least 5 or 6 inches of the cord is in sight, at which time it may be slowly severed. Do the same with the other. Some operators do not use their hands after pressing the testicles from the scrotum, but take them between their teeth and pull them out until the cords break. This is a good practice and more speed can be secured than in the former way. Removing so much of the cord usually lessens the inflammation and soreness, and the lamb doesn't seem to mind the operation so much as when the cord is cut so near the testa itself.—Exchange.

Dogs and Cows.

On all well-conducted dairy farms dogs are kept away from the cows. Some men think that, provided the milkers are not "heeled" up by Rover, the presence of a dog does not never welcome in the cow yard. Even that serves to irritate the milkers should be avoided, and a dog is never welcome in the cow yard. Even though the dog be peacefully inclined, cows, especially those that have recently calved, object to his presence.

I was recently on a dairyman's place, and he stated that he never allowed anything to disturb his milk-producers. His cows were all quiet, and could be handled anywhere in the paddock. They were driven to the yard slowly night and morning, and were always willing to come to the bails. Cows that are driven roughly are always troublesome. Harsh treatment in the paddock is invariably followed by rough handling at milking-time, and good results cannot be expected.

"My dog never bites the cows," said a farmer to me one day; "he takes them home almost as quietly as I could." Rover was sent to bring in the milkers, and he certainly did work carefully. Occasionally, however, he had to show his teeth, as a cow lagged behind or tried to break away from the others. Eventually they were yarded, but it was evident that several of them were considerably agitated from the chasing received. One unruly beast and a barking or biting dog will disturb a whole herd.

Referring to this question, a writer in "Hoard's Dairyman" states: "For the information of those who are in the habit of sending a dog for their cows, I wish to report a little experience which I have had along this line. I tested the milk from a cow after she was brought to the stable by a dog, the dog in turn being in charge of a small boy. She was considerably excited and quite warm. Her milk tested 2.3. The next morning it was 4.2, and a week later, when she was brought in by a man and perfectly cool, her milk tested 6.2. Now you can figure out whether care and gentle handling pays in a dairy herd. I should state that the pasture and feed were exactly the same in each instance.

Watch the Teats.

One of the most delicate and troublesome parts of a cow's anatomy is the teat, and the keeping of this right has a lot to do with the milk-yielding power of the cow. We keep a cow to produce milk, and the teat is, as it were, the "neck" through which it must all pass, and the condition of the teat must very much influence both the quantity and quality of the yield. In structure it is simply a hollow bag, just like the finger of a glove, formed of layers of tissue, and continuous with the skin of the udder. When the milk is formed in the udder, it percolates downward in to the teat and the open space in the udder above it—the "cistern." In milking, the squeezing of the teat squirts the milk out, and acts as a sort of massage to stimulate the production and flow of more milk as the work goes on. In most cases the disease or affections of the teat are those which affect the udder in the first place—if we except such skin diseases as "cow pox" and also wounds. If we keep the udder right, the teat will keep right, and under this head our greatest trouble is catarrh of the udder, or "weed" which may end in gargett. We talk of a cow with three teats when she may have four good teats, and it is really the "quarter" of the udder above the teat that is affected and has become "deaf" as the result of the above disease. Catarrh of the udder mostly results from exposure to cold and wet, but if taken early its development may be stopped. A warm fomentation, to be followed by rubbing on with plenty of elbow grease, an ointment such as the following: turpentine, 8 oz; soft soap, 4 oz—will go a long way to stop the trouble. For sore teats alone—such as pox or chaps—a dressing made with one part carbolic acid, one part glycerine, and ten parts linseed oil is very useful, while plain vaseline is wonderfully good for any trouble with either udder or teats.

Green Manuring.

Primrose McCannell says:—"The principal plants for sowing in this way are rape and mustard, but as leguminous crops, as a rule, enrich the soil better than others, we ought to employ them for preference, and it it quite easy to do so without any interference with the regular cropping of the farm. In southern districts it is exceedingly common to sow trifolium (crimson clover) on the stubbles for feed in autumn and the residue is ploughed in. But a correspondent states that he sows trefoil (medick) along with his spring corn on heavy land and white clover on light land, at a cost of about 5/- per acre, with the result that after the corn comes off he has a thick sward for sheep feed, which is afterwards ploughed in during winter, ready for spring again. Further, he had tried lupins among his oats. The lupins grow two feet high and the oats over three, and the crop is, therefore, difficult to harvest — especially in a wet season—but there is a splendid lot of green nitrogenous manure to plough in with the stubble. The growth of leguminous crops to renovate the soil has long been practised, and in recent years we have found out the reason why it does good; but sowing of plants like some of the above among our corn crops is a decided advance—American Exchange.

A traveller was obliged to patronise a man who had only a rickety old craft to carry passengers across the bay.

"Say, cap'n, has anyone ever been lost in this boat? It seems very unsafe."

"Well, not as I know of," the boatman answered.

Then the old boatman added: "There was four drowned from her last week, but we found 'em all next mornin' at high tide."

A Plea for More Simplicity.

After the first two weeks we keep a supply of chick food before the chickens and they can go to it at will. This is in direct contradiction to the methods pursued by many breeders and will not be endorsed for one moment by the large majority of writers who cry loudly the creed—don't overfeed, keep the chicks at work scratching for all the food they consume. But we do not do it that way. Experience has taught us better. By our method there is no struggling of the weaker to secure their food supply. The chicks will not overeat when so handled. They will eat often and little at a time. When liberated in the early morning they are as lively as crickets and are off over the range in search of worms and insects. They do not return frequently to the brood coop and "stand around the food bin" as has been said of them by one noted writer, who, we are very sure, has never tried this system of feeding. We know, not think, but know, that chicks so handled will consume less grain food than a given number will if fed from hand in the usual way. How do we do this? We have the figures to give the truth of this statement. For two seasons we kept a complete record, half of our young stock being handled on the food-at-will plan, the others in the customary way. Another point: When the food supply is before the chicks constantly they eat but little at a time. There is no gorging as there is when food is given in the old way. As a result the digestive organs of the chicks are in better condition. The chicks will balance their rations. Nature will attend to that.

There is altogether too much theory advanced in the advice given to breeders of poultry as what to feed the chicks and how to feed them. A nice hatched chick—one from healthy, vigorous parents, is a creature of nature which is bound to live if given the chance. We must bear in mind that our handling and rearing of fowls must of necessity be largely artificial. The cry of "get close to nature" in the bringing up of our chicks is too often a mistaken one. If the conditions surrounding the chicks were as nature would have it in providing for her own we could then feed as nature would. But such is not the condition. We must meet the condition.

Another matter: It has become of late the accepted belief that the growing stock as well as the matured fowls must be given a great variety of grains and foods. The man who is putting a food upon the market makes the fact very prominent that his food contains a great variety of grains. One manufacturer outdoing all others, and no doubt believing he will lead for some time, announces that the food he is offering contains 28 different grains and seeds. Then he works in the "get near to nature" theory, and tells how the wild fowls are so bountifully supplied with 28 or more different kinds of seeds, etc.

This is all nonsense. Nature never supplied her fowls and birds with wheat and oats and corn and barley, the best foods we can possibly give our chicks or our fowls. There are a hundred and one different seeds which the wild fowls consume that are absolutely worthless in the poultry yard.

The breeder who has a range for the young stock need not spend his time nor money on food theory rainbows. The best and cheapest food supply is near his hands, within easy reach.

Let us take oats, wheat, maize, barley and millet. These grains are always upon the market. These grains fed judiciously answer every requirement. In addition supply the stock with beef scraps, grit and charcoal, in self-feeding hoppers and the chicks will find a perfect food supply.

With proper cooping and care chicks will grow and develop with such a food ration—grow and develop properly. Upon the range they will secure all needed exercise.

Now as to the breeder, who is rearing his chicks in small barren yards. Such a breeder must be a thinker, a student if he is to succeed. He has created a condition which is almost wholly artificial. He must give thought to problems which do not confront the breeder with grass fields as range. He must supply not only food but means of exercise for the chicks. He must give especial care to the sanitary conditions of his coops and yards, and the first and most important matter is that of sanitary conditions. Let there be no mistake as to this.

We realize that by nature a chick is very active. Idleness is foreign to its nature. Therefore it would be unwise for this breeder to place self-feeding hoppers bountifully supplied before the chicks. Instead he should have roofed pens where the chicks may secure their food supply by work. They must have this exercise and in small yards this is the best way to supply it.

But here too, there need not be the great variety of foods now so much advised. It should be kept in mind that chicks thus confined

can not as well digest food as those kept on the range.

The idea is that we wish to take away as much as we can of the belief now being fixed in the minds of poultry breeders that chick life is so complex that one must be a chemist, a botanist, an all wise man in order to successfully rear chicks—must bring to their feed boxes, rare and expensive grains and other foods. It is not true. The common farm grains, comparatively cheap in price and always at hand, are all that is necessary. And this is true as to the food supply of the laying and breeding stock.—American Poultry Journal.

The Supply of Green Food

Fowls and chickens are very fond of green food, and it does them good. There are poultry-keepers who make a great mistake in giving their fowls long grass. They pull up long pieces of grass and throw them into the pens. Now this is a wrong thing to do. It is the means of either killing or ruining thousands of chickens, as well as many adult birds. Poultry of all kinds are so fond of green stuff, especially grass, that they swallow long pieces. These often get matted together into a ball in the crop, which is the means, in many instances, of rupturing the crop. This causes them to drink too much water, and the crop falls out, as it is only held up by the skin of the body.

The grass in all cases should be cut up fine. The best way to do this is to get a handful of grass, lay it on a board, holding it tightly in one hand, then get a long knife and it can be cut up easily. It should never be cut up more than an inch long for hens. As a rule, thr grass which is pulled from the banks is rather coarse, and is more apt to get matted before it is swallowed. Lawn grass is usually very fine, and will not hurt if it is two inches long.

If cabbage leaves are given the stems should be cut up small. There is more value in the stems than in the leaves themselves. Of course, when one has an abundance of cabbage leaves, he need not go to the trouble of cutting the stems up. Merely strip the green off and throw in to the birds. Lettuce is a very fine vegetable for all kinds of poultry. They will often eat that when they will not touch anything else; or perhaps we should have said they prefer it to cabbage green, etc. Green stuff is a natural food for poultry; not only that, but it saves so much corn, and is therefore a great help to the pocket, besides being beneficial to the poultry.

When people keep their fowls in confinement they should be careful, and not throw down too much green stuff at once—no more than the birds will clear up comfortably. If so it only lies in the sun and becomes withered, which makes it bad for the fowls, particularly if it is long.—Exchange.

Mating.

Few things are more worthy of careful attention than the proper mating of poultry. If one has a flock of common hens, it is possible, by placing with them a thoroughbred male, and securing a new male of the same breed each year, to change in three years' time all the common blood to that which is pure, and thus have a flock of pure-bred of the male variety. The way to bring it about is to select, according to the egg record, the best two-year-old hens one has, and then purchase a thoroughbred rooster, nine or ten months old, of such breed as he desires. The chief point in doing this is to keep in mind that the weak characteristics in the females should be the strongest in the males. The next year the most promising pullets from this mating in shape, colour, and other points should be selected and placed with another cockerel bought as before. The pullets then obtained will be likely to grow fast, feather rapidly, and mature early. Accordingly, they should be mated, not to a young rooster, but to a thoroughbred male two years old of the same breed, though not from the same breeder as the others were purchased from. Any reliable breeder who understands his business can furnish the right kind of a bird if the would-be buyer will only write him, designating the shape, colour, and general characteristics of his pullets. The results of this mating should be a lot of very fine poultry, including valuable cockerels all of which will find a ready market anywhere at good prices. Thus, by selecting the nearest to standard pullets in colour, shape, and characteristics one may carry the grading up still further year by year.—Exchange.

To secure the greatest profits from poultry, individuals of your flock should be maintained in the best of health. Too much care cannot be given to the physical condition of chickens.

The English market calls for eggs that will weight $1\frac{1}{2}$ pounds to the dozen. Those engaged in the import trade believe that in large eggs the albumen is thicker than in small ones, and that about 90 per cent. of the stale or bad eggs are small eggs with white shells. Shells of a brown color are preferred, and must be clean without having been cleaned.—Exchange.

Points About Eggs.

To say that there are eggs and eggs is to repeat one of the commonest of truisms. Eggs are as various as the methods employed to obtain them, or the uses to which they are put. But the egg of eggs, the real genuine "new-laid," the honest, flawless, unexceptionable egg, proudly laid by a wholesome kindly hen, is the egg which most interests poultry-keepers. Now, it is this very quality of freshness that all would wish to be able to judge of without the preliminary necessity of boiling and tasting. The Scottish proverb says: "The test o' the puddin' is the preein' o't." Granted, but how about eggs? One cannot of course sample eggs as one can milk, butter, or cheese. There are many recipes given for the detection of fresh eggs, but all, or nearly all, require to be carried out in the secrecy of home. A new-laid egg has a downy, new soft look as to the shell which the experienced eye cannot mistake, but which might well escape the observation of the novice. A stale egg often has a polished, glossy look, as if the merchant had given it a good rub up, like the fruiterer does to his apples. It may be mottled or have a dull look—a stale look, in fact. A fresh egg, when held to a strong light, is clear, and, if shaken in the hand, no motion or jarring of the contents should be felt.

The late Mr. Harrison Weir gives the following test in his book, "Our Poultry": "The plan of judging the newness of eggs was to put four ounces of common salt into a basin, and add one and three-quarter imperial pints of water. When dissolved, if a new-laid egg be put into this liquid, it will sink to the bottom; an egg three days old will be suspended in the liquid; beyond that age it will rise to the surface, and the older it is the more quickly will it rise." The white of a perfectly fresh egg is very difficult to beat into a froth, whereas this may be done easily when the egg is three or four days old. When an egg is hard boiled, if it has not been perfectly fresh, the shell will peel off with the greatest of ease, such as restaurant eggs will do, for instance; but if fresh, the white will adhere to the shell more or less according to the degree of freshness. When a stale egg, or one which is not strictly fresh, is opened, there is found to be a difference in the yolk, it evidently having a skin over it, and is very usually floating near the side of the shell. But besides this, there is a very decided difference in the flavour.

This quality of flavour is one which is frequently overlooked or under-estimated in the judging of eggs, and it ought to count as much in their favour as do freshness and size. Many consumers would deny that the flavour of eggs differs just as much as does that of beef, mutton, or pork. We have all heard of the much-esteemed delicacy of peach-fed hams, which American farmers provide by feeding their porkers entirely on peaches; and of the chickens, much beloved of Celestial gourmets which are finished on mushrooms and pine-apples. Feeding affects quality and flavour of the egg just as much as it does that of flesh. Very often the eggs which are condemned at the breakfast-table as stale, are in reality not so old as may be imagined. The unpalatable taste and musty, unpleasant odour come as frequently from poor, improper feeding, or because the birds are not of the right stamp to make good eggs from any food. Although not generally appreciated or understood, it is a fact that it makes a vast difference upon the flavour of the eggs whether they are laid by halfstarved, weedy birds or by fine, well-bred hens.

The egg is in itself a complete food, and it is a sustaining, strengthening, easily assimilated article of diet. It is made up of all the elements which sustain life, and hens can no more supply eggs unless supplied with these than a cow can furnish a good supply of milk on improper or insufficient food. The average hen's egg weighs from one and a half to two ounces. The shell is composed principally of carbonate and phosphate of lime. In one hundred parts of the white of an egg, about 84 per cent is water, 12½ per cent. is albumen, 2½ per cent. is sugar, etc., one per cent. mineral matter. Albumen is composed of nitrogen; meat is largely albuminoid; but the purest form of albuminoid in Nature is the white of an egg. In 100 parts of the yolk of an egg, 52 are water, 45 oil and fat, and of albuminoids, colouring, and mineral matter one each. We thus see that not only is carbonaceous material requisite for the yolk, but nitrogenous matter of which the white is composed, is also essential.

Water, which bulks so largely in the composition of the egg, is often one of the most neglected things in poultry-rearing, and in the case of farm poultry, as often as not, none is provided—the fowls can find it for themselves or want it. The duck-pond is usually the most convenient place, but there are also pools of stale water, not to mension the liquid which drains from stables, and the like. We believe that in the poultry-yard most of the ills to which hens are heir are traceable to the water, and this is true also of the ill flavour imparted into the eggs. Pure clean water is a most necessary "point" in the production of eggs.

Fresh-cut bones contain in abundance the ingredients which go to make up the different parts of the complete egg. The lean meat and gristle form the white, and about 10 per cent. of the yolk. The marrow and other fat on the bones supply the remainder of the yolk. The lime phosphates in the bone supply lime salts for the shell, and the necessary phosphates for the inside of the egg. In fact, bone is one of the most complete foods that can be allowed if given with grain, and has the recommendation of cheapness also. Lean meat is, of course excellent, but its price is prohibitive, and waste parts of animals if supplied continuously must be sound and fresh, else the flavour of the eggs may suffer. One would fancy milk should rank high as a food for laying hens, and so it does when given with grains and other foods. It is at best an adjunct, certainly a helpful one. It has been found that hens fed largely or almost exclusively on milk, produce eggs of a watery consistency, with yolks pale and sickly, the taste being poor and insipid.

Clover contains two very essential elements for the composition of the egg—nitrogen and lime; it is rich in both, and can be largely supplied. It is a sweet whole-

some food, which imparts both a good flavour and a rich colour to the eggs. Wheat and oats come nearer furnishing a perfect food than any other grains, not only because of the nitrogenous and carbonaceous elements they contain, but also for other materials. Feeding exclusively on wheat, however, gives rather a pale look to the eggs. Maize is a much abused food—abused in the use even more than in the popular estimate of it. Rightly and judiciously used it imparts richness both to the colour and flavour of the egg. One man may give maize liberally, and get eggs in plenty, while the majority will get nothing but fat hens and baskets full of disappointment. Lettuce, cabbage, beets (both roots and leaves), turnips and vegetgbles generally contribute most valuable properties to the egg, and when fowls have these in abundance, or have free range on grass land, there will be no complaints of the flavour of the eggs.

That the flavour of eggs varies with different breeds is well known to those who have studied the question. The eggs laid by Brahmas and Langshans are noted for their rich fine flavour, while those of some of the non-sitting breeds are not to be compared in fulness or richness with these. Again, some assert that white-shelled eggs are finer and more delicate in flavour than brown ones. However that may be, all are pretty much agreed that well-bred fowls lay better-flavoured eggs, and more of them, than do mongrels. Cross-bred birds—first crosses—are, of course, not classed as mongrels. A hen which lays well is generally a handsome comely bird with an alert business-like air about her. She looks as if she understood her business, and when the time comes on, knows her nesting-place, goes and deposits her egg, and is off again hunting for more material to keep up the supply for more egg-making.

Before finishing with the hen, which we are considering as an egg machint, one great point to remember is that such a machine requires careful and considerate handling. Gentleness is a sine quanon. Hens quickly recognise a new voice or a strange figure, and run away to hide, in doing which they are apt to injure themselves. Do not hustle your laying hens ; undue excitement or fright will check egg-production. The Chinese farmers train their hens to follow the harvesters so as to pick up the last grains left among the stubbles, and also the noxious insects which abound there. John Chinaman knows the value of tame birds. Witness his use of cormorants for fishing.—Exchange.

Fresh Ground and Fresh Air for Chickens.

Those who attempt to rear chickens on foul ground will find the process very discouraging. I know of nothing more against the chicks. They absolutely will not thrive, but are constantly mopey and unhealthy. They may survive, but it is in a very shaky form, and never in a robust state. Farmhouse fowls, as a rule, are always kept about the buildings and around the doors. This is a convenience in some ways. It is handy for feeding and supervision, but this is all that can be said in its favour. It is possible to disinfect ground for adult fowls, but the tender little chicks must have none but absolutely clean surfaces if they are to thrive like mushrooms and they are naturally capable of this. There is no half-way of dealing with the objection ; young chicks should be given clean, sweet ground from the first. There is a difficulty in doing this in confined runs, but such an excuse does not exist on the farm, where so much space is available. Take them away from the doors and surroundings of the manure heaps and liquids. Let them have a fresh, sunny spot, and then progress will be wonderful. This has often been proved. When chicks are drooping and will not get on, a move to completely fresh ground, where no chicks have been reared of late years, will put fresh life into them in a very short time. These new quarters must be away more or less distance from the house. Going back and forward to feed and shutting them up may be viewed as extra labour, but it will all be compensated for in the satisfactory way the chicks develop and get away from the miniature state.

As to fresh air for chickens, that is a great part of their daily sustenance. It is the best of all Nature's stimulants. Chickens under the care of hens at liberty are not apt to suffer for want of fresn air, the hens see to this ; but when the chickens are reared or quartered in foster-mothers the fresh air is often deficient. Many of their owners, too, have an idea that if they are kept close and warm they are bound to get on ; but the reverse is the case, and always will be. It is not implied that they should be kept in exposed spots, and all that, as that would be going to the other extreme, but even in the coldest weather chicks are more healthy with plenty of fresh air than they are in total or semi-confinement. This is certain.

Eggs Delayed in Hatching.

When eggs are only slightly overdue, it is quite possible that there may be good reason for the delay, and therefore it is always best to make certain that life is extinct before resorting to drastic means. This can very readily be ascertained by immersing the egg in warm water, but before doing so it should be carefully examined to see if there is any indication of a chip or breakage of the shell walls. Drop the egg gently into the water, keep the vessel steady, and watch carefully for the egg to settle ; then, if it remains perfectly still and without movement of any kind, or if it sinks to the bottom, it may be naturally concluded that life is extinct. On the other hand, a decided bobbing of the egg in the water will give the information that the young one is still living and fairly strong, when it can be expected that chipp ng will commence very shortly. Sometimes, again, the egg may remain stationary for a little while and then commence to move slightly, and even to bob in a more determined manner, and this would give hopes of the young one's ultimate hatching if returned to the bird in the nest.

According to the claims of cold storage men, brown-shelled eggs keep bettei than white-shelled ones, as they are heavier and thicker.

Botanist : "This is the tobacco plant." Fair Visitor : "How interesting ! And when does it begin to bear cigarettes ?"

Notes on Stock Turkeys.

The turkey is essentially a farmer's fowl, and, provided the location is suitable, there are few branches of poultry-keeping that prove more lucrative. A free range is essential ,to success and thus only those who have plenty of land available should attempt this particular branch. Turkeys, if kept in a very limited space, speedily taint the gsound ; besides which, they do not thrive as well, and cost considerably more to maintain. Many attempts have been made from time to time to keep breeding turkeys in confined runs, but with only a small amount of success. A large quantity of natural food — such as worms, grubs, insects, etc.—is essential for turkeys, and when at liberty they are able to procure an abundance, which not only assists in keeping them healthy and strong ; but greatly reduces the food bill—the bane of the poultry-keepers' life. The best soil is one that abounds in animal and vegetable life ; heavy clay or very light sandy soils are therefore unsuitable, the best consisting of a medium loam upon a gravel subsoil. Stock turkeys require protection both from the sun and rain, and thus unless there is a wood or a natural shelter under which the birds can go, some form of artificial shade should be provided.

The stock turkey should be large and of massive proportions, as size is so imperative a factor towards success. "Like produces like" is one of the inexorable laws of breeding, and only large parents can produce large chickens. For the same reason the breeding stock should be in perfect health, any that show signs of disease being discarded from the breeding pen. A common but very serious mistake is frequently made in using too young stock for breeding purposts. A turkey does not attain full maturity until it is nearly three years old, and thus if yearling cocks and hens are mated together the chickens there-from are liable to be delicate, entailing considerable difficulty in rearing successfully. There is no harm in using pullets provided they are mated with a fully matured cock, and vice versa ; but both parents should on no account be in their first season. A frequent cause of delicacy in turkey chickens is due to consanguinity — breeding from birds that are related to one another. Great care should be exercised in this respect, as the offspring from related birds invariably prove weakly and delicate. The number of hens to which a cock can attend depends to some extent upon the individuality of the male bird, but eight is usually the most satisfactory number. One service is sufficient to fertilise all the eggs of a clutch, and thus it is frequently thought that a cock can look after practically an umlimited number of hens. This is not, however, the case, and it is found that if too many hens are mated with one male bird a large percentage of the eggs prove unfertile, or, if not actually unfertile, the germs therefrom are so weak that the chickens are unable to make a successful exit.

The feeding of stock turkeys is very similar to that of ordinary fowls, differing in very few respects. Soft food should be supplied first thing in the morning and grain in the afternoon. A good mixture for the morning feed consists of three-parts barley meal, two pollard, one bran, and one peameal. Wheat, barley oats, are all suitable for feeding in the afternoon. Green food is of the most importance. Grit and water must not be neglected, without which they will not thrive well. At nights a comfortable house should be provided for the stock turkeys, and, while not requiring to be at all elaborate, yet it must be well made, dry, and free from draughts. Damp is fatal above all things, and particular attention should be paid to this matter. A wooden, cement, or brick floor is not as suitable as the ground itself. If the situation is at all damp, the interior filled up a few inches with dry earth or gravel and well beaten down answers the purpose admirably. Some breeders prefer to allow the birds, where the conditions are very favourable and the location not at all cold or exposed, to live in the open, roosting in the trees at nights, and claim that under such conditions the birds are stronger and more vigorous, whilst they lay equally as many fertile eggs. Once the turkeys have become accustomed to this mode of living, however, they are exceptionally healthy and strong, and the chickens therefrom hardy and easy to rear.

Feather plucking is frequently due to the birds being over-heated, owing to their food not having been regulated, or to irritation of the skin caused by insects, or a want of aperient medicine.

Pigeon Notes.

On Pairing.

(By Columbine, in "The Homing Pigeon.")

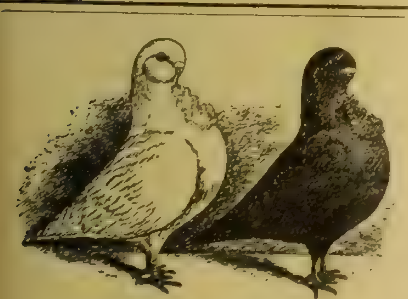
Pairing looks so simple, you have only, reasons the inexperienced one, to put a cock and a hen together in a box, leave them there for a couple of days, and the thing is done. Precisely, in the case of stayers who have been mated through previous seasons, given their old compartment within the loft, and a couple of hours, even less, suffices for the purposes of reunion.

In the case, however, of birds that have not been previously mated, the course described is the very one that ought never to be adopted, for it often results in very serious fights, to the injury of both birds.

A generation or so ago I had experience of it to my unfeigned regret and serious loss. There are numerous reasons which may be assigned as a cause for it in the case of a young hen, doubtless coyness and inexperience. Among the hens serious prejudice, I am sure, plays a most important part, and unless this is carefully studied and heeded, trouble will ensue. For example, I have known hens which would not take kindly to a mate that was not a particular colour. Attempted union with another led to internecine warfare during confinement, and desertion on the part of the hen immediately she was granted her liberty. She would make up immediately to a cock of the colour she desired, and until her wishes in this respect were gratified the loft was in a state of continual turmoil.

With the dangers thus described confronting him, the inexperienced fancier will welcome a safe alternative. The pairing cage which has ever commended itself to me, is about the shape and size of an orange box, so arranged that it can be divided by means of a sliding panel into two compartments, each fitted with a separate door. The sliding panel in the first instance should be of glass, in order to allow the birds to be in full view, the one of the other. Quickly, after being placed one in each compartment, the cock commences his tuneful overtures, not, at the outset, apparently, appreciated by his companion, whose coyness, however, soon wears off, she falling a victim to his seductive wiles, displaying reciprocation by trailing her tail feathers along the floor of the temporary cell. Twentyfour hours in the vast majority of cases suffices for the courtship, and then, the sliding panel being removed, the outcome will very shortly be noticed. If all is well, the pair may be removed to their selected nest box in perfect safety. If however, in lieu of billing and cooing, hostilities become the order of the day, the birds must be separated again without loss of time, the glass panel being replaced by another formed of laths rather closely nailed together, at the bottom of which is hung a pair of bobwires, admitting from the compartment in which the hen is placed to the other one only. Usually an extra day or so suffices to secure the object in view, although occasionally a longer period is necessary.

I would say here that some hens are most difficult to pair until their peculiarities are understood. For example, I have known hens that would not take kindly to a mate that was not of a certain colour. One which displayed this peculiarity would mate readily with a red or mealy, but no inducement could persuade her to pair with blues, black, or chequers of these hues. Confinement for a time much in excess of what is reasonably required for the purpose would apparently bring about the desired result, but once in the loft amongst the colony she caused endless trouble by making up to one or more of the colour which evidently fascinated her, thus disturbing arrangements already completed. Find her a mate suitable, and she was as docile as possible, a capital breeder and feeder. I have no doubt that there are many similar instances that have come under the observation of fanciers, of which details would be interesting.



The Homing Instinct in the Homing Pigeon.

(By Edgar Chamberlain.)

The mysterious power which the homing pigeon possesses is, to my mind, nothing more nor less than the "instinct of direction." Many will no doubt wonder what I mean by the "instinct of direction," but of such wonderers I may ask. "How often have you asked when going over an unknown road, 'In what direction does B—lie?" Your reason bids you ask for guidance in determining the direction. The bird is left without this guidance, but instinctively knows or feels the direction in which the loft lies.

Let me illustrate my meaning by a comparison. In the pathless Sahara certain nomadic tribes are able to find their way over the wastes of sand to unknown remote places, without being previously informed of the direction in which such places lie. Surely we have here a parallel to homing, as the same conditions apply to both. Great thinkers are of opinion that these Nomads accomplish their purpose through and by what is known as the "Instinct of Direction." Inquiry is not brought into play. Is reason? I must at this stage leave the reader to decide for himself. 'Tis at any rate a true parallel, and the pigeon, on those race days when adverse conditions prevail, is able to return to his loft by this same "Instinct of Direction." There will be many who will not agree with me in this, and yet these very unbelievers will not chance turning their birds from the South road to the North or vice versa, because they have trained them in a certain particular direction, and they think a change might be disastrous to the bird's successful return. Do not these men, by sticking to one road, unconsciously endeavour to cultivate and augment in one direction, this very instinct of direction, and which, to my mind, is the completion of the whole fabric of the homing instinct.

It matters not if birds are changed from the South to the North this instinct will still assist them, for they feel that the loft lies to the North or South as the case may be. He may be some time before he discovers the right direction, perhaps some days, but it is through this instinct he ultimately attains his object. Mental processes are so intricate and peculiar and are governed by forces which at times seem to exist, as it were, outside the brain, that they appear altogether unaccountable. But take the instinct of direction from the homing pigeon, and I feel that we should get a far less intelligent bird than we at present possess. I wish to be thoroughly understood on this point, as it is necessary to a thorough knowledge and appreciation of the homer's great mental gifts.

Migrants possess this instinct in degree, but only in degree, as geographical and meteorological conditions assist them in their migrations. They are at liberty to choose their own time and their own route and as birds seem to have a prescience of what meteorological conditions are likely to maintain, this constitutes no doubtful advantage. Again, when we trace out the migrant's path, which is not in a straight line, but one free from geographical difficulties, we appreciate this fact more fully, although the migrant returns to a district, while the pigeon seeks its loft. The direction of the migrant's path is fixed through instinct and inheritance. The homing pigeon, on the other hand, has to exert this gift in order to find its loft at all times when the will of its owner so dictates, and its journeys are not constant, but ever-changing, ever-varying, and herein lies its superiority to the migrant. One so ruled by necessity, which leaves a certain amount of choice, the other by compulsion, which leaves no choice; for one has the power to choose time and direction, while the other has no choice of either. Some, I fear, will fancy I am stretching a point. If so, how is it possible to account for a bird's success on both the North and South roads? How is it possible to account for birds returning to their old quarters after the expiration of three years or more? These questions can only be intelligently answered by admitting the existence of the "instinct of direction," for such birds must possess it in pronounced degree. Call it a mental process if you will, or call it a feeling, it is still there, and is a most marvellous possession. Training and habit foster it, for as it exists in a far more eminent degree in the homer than in the migrant domestication must have done much in bringing about so great a modification.

It may be thought that I have laid too great stress on the exercise of mental qualities in my treatment of this subject, as so many people regard pigeons as mere animated machines, and homing as a direct result of physical causes and physical expenditure. May I humbly suggest that in the process of training, the greatest strain is laid on the intelligence and not on the physique, and when young birds are over-done, either through the ambition or ignorance of the owners, partial or total paralysis is bound to result. As paralysis is a nervous disorder—a loss of motion or sensation in any part of the body—and as the nerves are not only the overseers of the muscles, but also the telegraphic system connection all and every part of the bird's body with the brain, the muscles may be in as healthy a condition as possible when paralysis sets in, and therefore we must go to the other end to discover the cause, viz., the brain.

Joke Seller: Did you receive my letter and that batch of jokes? Editor: I received the letter, but I didn't see the jokes.

The Household.

The Way on Wash-Day.

— Snowy Clothes to be had at the Expense of a Little Care. —

All the white clothes should be put into cold water, softened with a little borax, the soiled parts rubbed with some good soap and placed well under water.

All articles touched with iron rust, fruit or ink stains, may be soaked in some milk for twelve hours, and if very obstinate they should be treated with salt and lemon until they disappear.

For flannels use soft water moderately warm, and no soap powder or soda. All the little odds and ends of soap should be saved in a jar kept for the purpose, and reduced to a jelly by adding half a pint of water to quarter pound of soap scraps, and letting it heat. This jelly may be used instead of soap, and the flannels should be washed very thoroughly, working them about well in the water. The white ones should be done first, and the coloured ones next in the same water.

Wring them lightly, shake out and put aside until all are done, taking care that one does not touch the other. Then take clear tepid water, put them through it to remove the soap, and put through the wringer. Shake, pull them into shape, and hang in the shade to dry.

Coloured prints, if there is any doubt as to the fastness of the colour, should be soaked first in salt and water, and then washed just like the flannels. They should be rinsed in clear cold water, with one tablespoonful of vinegar to two gallons of water.

If they are wanted slightly stiffened, they should then be put through thin starch made with boiling water; if very stiff—as for skirts, etc.,—they must be dried first and starched afterwards. Coloured things should always be dried in the shade, and well shaken before hung to dry.

Very delicate cotton or coloured things of any description, silk or flaxen embroideries, etc., should be put in bran water, with soap jelly, and afterwards rinsed in salt and water. Iron the wrong side.

Water in which white clothes are washed and boiled should be softened with soda or some good washing powder. White shirts, collars, cuffs, handkerchiefs, etc., must be done first. Put them in a small tub with sufficient cold water to cover them, soap the wristbands, collars, and any soiled pieces, roll them up, and let them remain in the cold water until that in the boiler is hot.

Then let hot water run into the tub, and wash each article thoroughly

taking care to rub your clothes and not your fingers, and to get every particle of starch out of the stiff things, otherwise they will not take starch properly again. Then soap them slightly, and throw them into the boiler, stirring them about a little with an ordinary washing stick. Wash sheets, pillow-cases, etc., in the same way, and pour cold water on the things taken out of the boiler. Rinse in clear, cold water, slightly blued, and wring; shake them well, and hang up to dry. A clothes-line should always be dusted before clothes are put opon it.

A small pan of very thin starch, made with bo ling water, should be at hand in which to put the tablecloths, etc., after they have been put through the blue.

Embroidered frills, etc., should also be put through this, squeezed, and pulled into shape before hanging out to dry.

On a good drying day all the fine clothes will be ready for folding by the time the last are washed. Two persons should fold each sheet and tablecloth, taking the ends and shaking and pulling them into place.

Everything must be well sprinkled with clean water, and if they are packed smooth and firm into the clothes basket, covered with a clean cloth, and left in a cool place until morning, they will iron much better than they otherwise would.

What to do With Rose Leaves.

Crystallised Rose Petals.—Select the choicest petals, uniform in size, from the outer rows of double, full-blown roses, and spread on paper to dry for a few hours. Prepare a thick syrup, made of clarified sugar; slightly flavour with rose water, and, when boiling hot, dip the petals, before they begin to wither, into the syrup, allowing them to remain a few minutes. Carefully remove them, and place on oil paper to dry for three or four hours. Dust with pulverised sugar; turn them over, dusting the other side, and let stand until dry. These dainty bits of blossoms make delicious sweets, to be served at the five o'clock tea.

A Rose Jar.—Take two quarts of fresh rose petals, gathered before the sun is on them—their fragrance being stronger in the early morning—and a gill of salt. Toss the rose leaves lightly for one hour to dry. Sprinkle salt on the bottom of a large bowl, add a layer of rose leaves, then salt, and so on until all are used. Let them remain three days, in some apartment free from sunshine and undisturbed by the wind, stirring and turning twice each day. Add an ounce and a half of dried allspice and half and ounce of stick cinnamon, broken into pieces. Let this stand for a week, stirring daily. Put into a permanent jar and add the following ingredients: — One ounce of orris root, sliced thin; half an ounce each of allspice, cloves, cinnamon, ginger root (sliced thin), one-fourth pound af fresh dried lavender blossoms, the rose-leaf stock, one greated nutmeg, one-fourth ounce of aniseed, five grains of finest Canton musk, half an ounce of the oil of rose-geranium, one-fourth ounce each of the oils of jasmine, lavender, lemon, verbena, musk, violet, rosemary and bergamot. This mixture is warranted to be fragrant and if the jar is kept tight will last for years, though from time to time a little lavender, or orange flower water, or any nice perfume may be added. When it is desired to perfume a room, open the jar for a little while, and the apartment will soon be as fragrant as a garden of roses.

Rose Water.—Take two coffee-cupfuls of rain water; drop into it eight or ten drops of attar of roses. Carefully stir a spoonful of pulverised magnesia into the water and pour it through filtering paper, which can be procured of the druggist. Pour into bottles, cork, and use as extract for the crystallised petals or perfume for the rose jar. Always rinse out the jar with rose water before filling it with the prepared petals—From Home Notes.

Hints for Hostesses.

The perfect hostess needs a sympathetic heart, infinite tact, delicacy, and discrimination; needs to be Argus-eyed, so that, while she is having a chat on her pet subject with a favourite visitor, she can see someone behind her who is left alone and looks dull. Then she must leave her pleasant companion or present him to the other. A good hostess does not throw those together who are utterly unlike in tastes. Then there is the large army of long-winded people who have to be patiently dealt with, so that they can go away feeling how much they have contributed to the brightness of the occasion. A woman to entertain well, must be unselfish, never minding fatigue if her guests are only happy. She must listen courteously to the long stories of others, and thus gain the reputation of being a brilliant talker without effort, and perhaps she may be rewarded by having a chance to wag her tongue on her theories at somebody else's tea.

Tit-Bits.

Try rubbing knives and forks with a piece of orange or lemon peel if the taste of fish seems to cling to them.

Save every scrap of tissue paper that comes into the house for wiping looking-glasses. It gives a peculiar lustre to the glass.

— A Bedroom Hint. —

Never draw the curtains in your bedroom, particularly during the day-time on sunny days. Sunlight is one of the factors essential to health, and a room wherein the sun shines is pretty sure to be one that will invigorate the body during sleeping hours.

— Walnut Stains on Linen. —

First use a hot solution of oxalic-acid, then dilute muriatic acid, followed by a solution of tin, or follow the muriatic acid by pouring over it some dilute chloride of lime or soda, finally rinsing well in warm water. Or, first apply melted tallow to the stain, then wash in a solution of pyrophosphate of soda until both tallow and ink disappear.

What Women can Do to Keep Boys on the Farm.

I sometimes think we don't half realize how large a part the boy plays in the lives of the most of us, or how dull and commonplace the country would be without his folly, and fun loving mischievous presence. The country is certainly the best place for him as it is little less than a calamity for a healthy boy to be obliged to confine his activities, or work off his surplus energies, within the narrow confines of a city.

The subject of how to keep the boy on the farm is being much discussed, but no one can do more to solve that problem than his mother. It is said that a child's education should begin with his grandparents. Certain it is that it should begin very early in life.

Take him to help you garden that he may early become interested in growing plants. Show him the seed germ as it starts, and encourage him to watch for it to push its way up through the soil. Call attention to the beauties of the unfolding leaves and watch with him the growth and development from the tiny shoot to the fully matured plant. Show him the relation the blossom bears as it opens and closes to the fruit, and get him interested in hunting for varied forms of plant life in the home surroundings. Explain the necessity for thorough cultivation and the eradication of all weeds that the plants may receive the full benefit of the fertility of the soil. Point out the beauty of a well cultivated garden over one that has been neglected. It will help him when he has passed out to the larger realm of farm work, to understand why father insists that the fields be properly cultivated, and having learned the reason will not feel that, "Father is an old crank, just wants to keep a fellow at work." Give the boy a reason for what you expect him to do, and as a rule you will have no difficulty.

Help him to understand that though he is small, there is much he can do to help, and from the first exact instant and unquestioning obedience from him. Don't allow yourself to be coaxed or bullied into giving up to his whims. A boy soon loses all respect for a mother he can coax into granting his wishes against her better judgment, and with unutterable contempt in his voice will explain to his chum, "O she is easy. I can coax her over in a minute." Be honest with him in all things, fulfilling all promises to the letter. We have no more relentless critics than our children and a boy can conceive no greater injury than to have his mother fail to measure up to what he has a right to expect of her. "Thou shalt nor bear false witness," means infinitely more to a boy worked out in the family life than hung as a motto over the door. Teach him to be interested in and gentle with all live things. Show him the difference between a butterfly and a moth, and help him observe the changes in animal and vegetable life as the season advances. Help to watch for the first birds and flowers of spring and tell him something of each. Make your home beautiful with trees and flowers that he may early learn to love the beautiful and form high ideals. If he brings a bug or other insect to show you, don't give a shriek of terror and tell him to take the horrid thing away, but examine it with him, point out the beauty of its coloring, or the peculiarity of its formation and should he bring a pebble or some curious form of plant life, be interested with him, fix up a shelf in his room, if you can't afford a cabinet, that he may have a place for his treasures. Don't throw them away as trash. They mean much to your boy.

His room should be his to ... as his needs require, and if shared with another, each should be taught to respect the rights of the other. In many homes there is a great difference in the furnishings of the boys' and girls' rooms. That is not just to either. Encourage the sister to make pretty and convenient things for her brother's room and also to keep it in order, and note with what pride he will call his chum's attention to the "gimcrack" that sis made or "see the handy contraption that mother gave me for my birthday." Help both to understand how much they may be to each other in many ways. A sister is the best of modifiers for a boy, and a brother is the best anchor (except father) a girl can cling to.

Give your boy the best education you can, not with the idea that many do; that you want to fit him so he can make a living easier than drudging on the farm. That mistaken fallacy is fast vanishing into thin air, thanks to greater knowledge of business conditions. There is no class of men to-day, that needs to be educated along so many lines as does the farmer. Supplement his schooling with readings from the wide-open book of nature, as the broader and more complete his education, the greater will be his success as a farmer and a man. Keep in touch with his school, be a friend to his teacher, inviting her to your home that she may feel that you are interested in her and the work she is doing. Many times she is little

more than a child and will be glad of your sympathy and help.

There is a general move all along the line to have agriculture taught in all schools, which is a fine thing, but while we are teaching farming to the boys, if we would go a step farther and teach our daughters to be efficient, contenttented home makers on the farm, we would do much toward making our boys contented farmers. If I were asked to tell in one sentence how to keep the boys an the farm, my reply would be, "Keep the girls there." Just as long as mothers bemoan the hard life of a farmer's wife and educate their daughters to think they will be happier anywhere than on the farm, just so long will the majority of the boys seek some occupation in the city. Teach your boys to be courteous, self-respecting gentlemen and they will be in no way inferior to anyone whom they meet.

Take your boy to church and Sunday school and be an active loyal worker yourself that he may early become interested and enlisted on the side of right and justice. A boy has an inherited right to a dog, gun, and fishing tackle. Give them to him and the opportunity to frequently use them and when he brings home a bag of game or string of fish, rejoice with him. Get up a family fishing party occasionally, inviting a neighboring family to join. It will do you all good and make the boys happy.

Make a red letter day of each passing birthday and all holidays. Invite his friends and give them the best room in the house, yes, all the rooms. You don't entertain your friends in the barn or on the woodpile. Why should your boy? Furnish plenty of games such as children delight in and have a dish of apples, nuts or pop corn for them to munch. Mingle with and be one with them. Don't worry about your dignity, it won:t get lost. It is time parents, teachers, and preachers ceased to perch themselves on a pedestal so high as to be out of the reach of the boy they are trying to guide. You must come down to your boy's capabilities for a time, if you wish to keep pace with him as he develops and according as you bind your boy to you, with loving sympathy and keep in touch with his mind and heart, so will you be able to guide and control him when he most needs you. If your boy has not perfect trust and confidence in your love and judgment, at the age of ten or twelve years, you will not be able to influence him at the most critical time in his life, the adolescence period.

The boy should be kept busy with a judicious mixture of work and play. I would like to emphasize, let the work come first. Idleness is the mother of nearly all the discontent and mischief of boyhood. He should understand that he must work, as regularly as his father, that he is a part of the firm and that he is not only working for his father, but for himself also. The farm business should be an open book to him, that he may know as much as his father, the value of the stock and products of the farm, also what it costs to conduct the business. He will then be able to see the necessity for reasonable economy and be better satisfied if he knows what the proceeds from the farm are used for.

He should be encouraged to purchase some good stock for himself and care for it along with the other farm animals. Take special notice of it occasionally. Note improvements, if any, but don't be afraid to criticise if there be need. You must be brave and strong enough to help your boy see his faults and insist on betterment.

When the stock is sold, advise him about investing the money to the best advantage—thus teaching him business methods and increasing his property interests and responsibilities at the same time. In short, give the boy a square deal all around. It may seem to many that these points were better left to the father, but in most cases the father is so busy supplying the needs of the family and farm, that he leaves the family affairs to the mother, believing that in all things pertaining to the home "It is a woman's hand that rocks the world."

While busy making a good farmer of your boy, don't neglect the social side of life. Fill your home with flowers, music, and laughter. Keep up your personal appearance. In the hurry and stress of work, you are apt to grow careless in dress. You may not always be able to have elegant clothing, but you can always be carefully and tastefully dressed with hair becomingly arranged. When you go out with your boy, be especially careful in dressing, making the most of any beauty you may possess. He may not tell you, you look fine, but the quick glad look he will give you is worth working for. A boy is more sensitive than he appears to be and should never have cause to blush for his mother's personal appearance.

Get him interested in organizing the neighbours into a social and culture club in which both old and young can take part. Hold regular meetings and have programmes that will be instructive and entertaining. The head of the house may not be very enthusiastic about going out evenings, but he will go to please you if you present the subject in the right manner. Go with your boy to lectures and concerts. Give him the benefit of the best that comes your way. Patronize the public library if there be one, if not, get a movement started to provide one in some way. Furnish games of all kinds and a good supply of the best reading, magazines that discuss all up-to-date subjects, good stories of travel and adventure, written by men and women who are alive with good red blood in their veins and know something of what they are writing. Have parties. Work, read, sing and dance with your boy. Don't be shocked, careful mother, but invite in such young people as you wish your boy to associate with and let them dance or play as they wish. They may take a little polish off the floor, better that than having him out in the streets looking for a place where he can have a good time, and he will find it, too. He will be a much better boy, dancing with a few select friends in his home, than he will be with heart and brain hot with rebellion because you have denied him the privilege.

You may not lay up a large bank account, but you are doing something far better. You are working to build up and complete the best finished product of the age, a broad-minded, well-educated, honorable farmer.

All this may sound rather strenuous, but when God gave us the privilege of motherhood, it was the greatest honor he could bestow. We should put forth every effort to live up to its requirements. In a few years, when your boys have gone out to farms of their own and some other boy comes to help with the work, be good to him, give him a pleasant home and you will not only have kept your boys on the farm, but you will do much to solve the problem of farm help.

(The above instructive paper was read by a lady member of the Winconsin Horticultural Society and is taken from the yearly report of that progressive Association—Ed).

Tried Recipes

— Mutton Pie. —

Cut the meat into slices, removing all fat, skin and jelly. Cover the bottom of the pie-dish with slices of boiled potatoes, then a layer of mutton, sprinkled with pepper and and salt, and a little chopped onion. Continue thus until the dish is full, lastly putting on a thick crust of mashed potatoes. Cook in a quick oven for half-an-hour, when the pie should be nicely browned.

— Eggs with Mushrooms. —

Eggs with mushrooms are a dainty luncheon dish. Drain half-a-tin of mushrooms from their liquor, slice them, and stew over a slow fire with a large tablespoonful of butter and a seasoning of salt. Then stir-in a teaspoonful of flour, and when smooth and turning rather yellow dilute with a gill of the mushroom liquor. Turn this into a buttered white earthware dish (a shallow one of course), break on six eggs, and place in the oven until set. A china or silver skeleton-dish is nice to slip over dishes that have been in the oven before sending them to the dining-room.

— Savoury Breakfast Kidney. —

Take half - a - pound of bullock's kidney and cut it into little pieces, place in a stewpan with a little gravy and stew for an hour. When cold, stir-in a dessertspoonful of flour, add cayenne pepper and salt. Place the kidney in a Dutch oven, scatter the mustard, etc., over, add a piece of butter, and cook till the meat is well heated. When done, the kidney should be tender, with a little thick gravy sticking to it. This dish is very useful where there is little t me to prepare hot breakfasts, for it can be stewed and set in readiness the day before.

— Ham Cakes. —

These are very nice for breakfast if you have the remains of a ham that is no longer fit to appear at table. Mince the ham very finely, after removing all gristle and skin. Add a little cayenne pepper. When quite smooth form into cakes the size of a five-shilling piece and a quarter-inch thick. Cover with mashed potatoes, and fry in boiling fat. A small quantity of soaked bread-crumbs may be mixed with the ham.

— Spring Onions a la Creme. —

Select a bundle of the larger variety; wash and "tip them carefully, then simmer gently in a little well-flavoured stock. When cooked, remove the onions to a square of toast on a hot dish. Thicken the stock with a heaped tablespoonful of flour, and stir-in by degrees threepennyworth of cream, and a bit of butter about the size of a walnut; add a pinch of salt. Make very hot, pour over the onions, and serve immediately.

— Peas as Food. —

Green peas while young and tender are among the most succulent vegetables, and are fairly easy of digestion. They are then less nourishing than peas which are matured. Late in the season, when they become old, no amount of boiling will soften them; indeed, the longer they are boiled the harder they become. In this condition they should be soaked in water for some time, and then crushed and stewed, or treated in the same manner as dried peas, to render them palatable and digestive.

— Eggs in Marinade. —

Put two tablespoonfuls of water, four of good gravy, and a teaspoonful of vinegar over the fire, and when it boils stir-in the well-beaten yolks of two eggs; when the sauce thickens, pour it around half-a-dozen poached eggs garnished with sippets of toast.

— Brain patties, —

Brain patties are a decided delicacy, and will prove a good supper dish. Take some calf's brains which have been boiled, add a hard-boiled egg, chopped small. Flavour with a little chopped parsley, a suspicion of lemon peel, a small pinch of powdered mace, pepper, and salt. Make some puff-paste, line half-a-dozen patty-tins with it, and fill with the mixture; moisten the eggs with water, and cover with paste. Brush the patties over with the yolk of an egg, and bake in a quick oven for ten or fifteen minutes. These patties can be made equally well of cold chicken and a little chopped ham.

— Beef Sausages. —

Clear the beef and suet from all skin, bone and gristle; take two pounds of lean beef to one pound of suet, add pepper, salt, and mixed spice, and shallots, or any other tasty condiment, according to liking, chop very fine and mix well together. Some cooks prefer to pound the whole in a mortar, but if the meat is well minced this is needless. Roll the meat into sausages and fry until it becomes a nice brown colour, and serve in the usual way with mashed potatoes round the dish. They are more delicate if pressed into skins. It is worth notice that all meat cooked with the skin retains its original flavour, and is much preferred by connoisseurs. Time to fry: ten to twelve minutes.

— Sago Pudding and Apricot Sauce—

Set about half a pint of milk to boil, then scatter into it an ounce of fine sago, stir for a few moments, and stand by the side of the fire to finish cooking. Take the sago off the fire, add to it a tablespoonful of castor sugar, a tablespoonful of butter, a few drops of vanilla essence, and the yolks of two or three eggs. Whip the whites to a stiff froth, and stir lightly into a mixture. Butter a pudding basin, and ornament the sides of it with strips of candied peel, and pour in the mixture. Tie over a piece of buttered paper, and steam the pudding for an hour. The sauce should be made of half a pound of apricot jam dissolved in a gill of hot water, a gill of sherry, and passed through a sieve. Turn the pudding out to serve, and pour over the sauce, and serve very hot.

— Butter Biscuits. —

Half a pint of milk, two ounces of butter, one-and-a-half pounds of flour, two ounces of sugar. Warm the butter and milk; mix the flour and sugar together, add the milk and butter, and knead unt l quite tough; roll out and cut into biscuits, and bake.

— Feather Cake. —

One tablespoonful of butter, one teacupful of sugar, one and a half teacupfuls of flour, half a teacupful of milk, two eggs, and one teaspoonful of baking powder. Beat butter and sugar together and a little of the milk; add flour and baking powder, a little at a time; lastly the eggs, beaten very well, and the remainder of the milk. Bake in a hot oven.

— Baked Tomatoes. —

One pound of tomatoes, two hard - boiled eggs, quarter - of - a - pound of butter, the juice of a lemon, bread-crumbs, pepper and salt to taste. Fill as many scallop-shells as required in the following way: Butter the shells, and put in a layer of bread-crumbs, then a few thin slices of tomato, a little of the egg finely chopped, pepper, salt, and a few drops of lemon-juice, and another layer of bread-crumbs, pour over each a dessert-spoonful of oiled butter, and bake in a good oven for about a quarter of an hour. Serve w th mustard.and-cress lightly sprinkled on the top.

— Rice Cheesecakes. —

Beat two eggs with four ounces of ground rice, four ounces of butter (melted), one teaspoonful of baking-powder. Mix well, flavour with the grated rind of a lemon, line patty-tins with pastry, and allow about half-a-teaspoonful of the m xture to each one, and bake in a quick oven.

— Curd Cheesecakes. —

Take a pint-and-a-half of new milk, and curdle it with a teaspoonful of strong rennet. Break the curd with a wooden spoon, and drain the whey from it. Add to the curd one well-beaten egg, a dessert-spoonful of sugar, currants, and chopped candied-peel. Flour with grafted lemonrind to taste. Line some patty-pans with good puff paste, fill with the mixture, and bake.

— Tomato Cheese. —

Melt an ounce of butter in a saucepan, and stir-in one-and-a-half tablespoonfuls of tomato-pulp or sauce. Add three ounces of grated cheese, pepper, salt, and cayenne to taste. Make very hot, pour on pieces of toast, and serve at once.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide. Telephone, 1284.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

Garden Notes for December.

It is of little use transplanting small seedlings into roughly dug ground. Dig the beds finely and rake the surfaces level. As each tiny plant is put out, the soil must be pressed very gently and yet firmly round them with the fingers. Water must be given at once, and it may be found needful to place some sort of a shelter on the north side, such as a small sprig of eucalyptus. The slugs are a terrible nuisance in seedling beds, and nothing but constant attention can save them from the scourge. Dusting with lime in the dusk of the evening and protecting with zinc rings are the most effective ways of circumventing the slug and the snail.

The following seedlings are suitable for present planting :—

Sunflowers. — The Miniature, Orion, Diadem, the Silver-leaved, and the double. All of these are very effective, and no garden should be without one group of them. The Silver-leaved is taller than the others, and must be planted in the back rows.

Zinnia.—This is a very effective summer annual. It is best grown in beds by itself, where it will make a grand show. Unfortunately, its flowers are too stiff for indoor decoration.

Portulacca.—A grand summer edging. Only grow the double, the flowers of which resemble miniature Roses. It makes its grandest show during the sunniest days.

French and African Marigolds.—The French are dwarfer and more compact than the African, and the flowers are much smaller. There are several varieties, all of them worth a trial. These may be classed as distinctly good.

Asters.—This is an all-round good annual. Grow it in groups, borders, or beds. They may be procured in an infinite variety of colors and kinds. Take care to plant the taller kinds at the back of the border, the dwarfs in front.

Balsams.—Want a somewhat sheltered situation, and one where there is no stint of water. With care and good cultivation they are lovely, without them they will do no good, and are worse than useless.

Calliopsis.—Once grown, always grown. Their light graceful gold and brown are invaluable both for indoor and outdoor decoration. Don't fail to put out at least half a dozen plants of this favorite, and as many more as you can find room for. Given water they will continue in flower for several months.

Salvias.—Put these out in quantity, especially the scarlet kinds. They are perennials, but are best treated as annuals. A small bed planted with a dozen plants will be a source of pleasure to you right through the summer months and into the autumn.

Salvia Patens, a heavenly blue, also does well, and is worth growing. They must be kept well watered.

Amaranthus.—These are grown solely for their brilliant color effects in the garden ; they are useless picked. There is a good choice of kinds, and if planted according to color and height, they present a unique appearance in the autumn.

Petunias.—Best planted in well-prepared beds, The Superbissima, those with the gloriously veined throats, the beading, and the fringed edged, make a grand show. A small bed under a bedroom window diffuses an exquisite scent in the dewy morning. Slugs are especially cruel on the Petunia, and if not promptly attended to will quickly clear a bed.

Gaillardias.—These are as useful as the Calliopsis, and, if anything, more easily grown. A root of the herbaceous perennial will last for years in a garden, and will be a constant source of joy.

Phlox.—The grandest of them all. Don't forget it, for you must have it. A threepenny packet may be put in during any month in the year. Seedlings of this annual should be always handy in the boxes. You cannot plant it too often nor too extensively. Plant it in clumps, plant it in edges, plant it in beds, and plant it in window boxes, for Phlox and Stock are the two grandest annuals we have.

Cockscombs may also be put out. The fine Celosia Thompsoni Magnifica, is not so stiff and more decorative than the older kinds.

Capsicums.—The small-berried ornamental kinds are pretty and useful.

Mina Lobata.—A glorious annual creeper. Every one, I should think, has space for one of these. The bush remains covered with the curiously and brilliantly coloured flowers for some months.

Hunnemannia. — Resembles the Eschscholtzia, or Californian Poppy, of which it is a cousin. Color soft lemon yellow. Very hardy. Good as a picked flower, and a good bedder.

Sturt's Pea.—The seed of this is best planted where it is to grow, as it is a bad mover. It delights in a sandy soil, and water applied to the root, so avoid giving it moisture overhead as much as possible. Look out for snails and slugs, who are fond of destroying even large plants by eating off the bark of the large limbs.

About Roses and the Plebescites.

The recent vote on Show and Garden Roses arranged by the Rose Society and the "Mail," added and is still adding to the interest with which the flower lover regards the Queen of flowers. If such a thing was possible, it has given a fillip to the Cult of the Rose. The thanks of all interested are due to those responsible for making this expression of opinion possible.

Taking the show list first we find the following twelve were those selected at the Rose Show:—

1. Belle Siebreicht, pink.
2. White Maman Cochet, cream tipped pink.
3. William Shean, pink.
4. Lyon Rose, coppery rose.
5. Mrs. Edward Mawley, pink.
6. Alliance Franco Russia, deep yellow.
7. Bessie Brown, flesh pink.
8. Queen of Spain, flesh pink.
9. Dean Hole, pink, shaded carmine.
10. Mrs. David McKie, deep cream.
11. Mildred Grant, white, shaded violet.
12. La France, silvery pink.

Little serious fault could be found with this list by the most expert and exacting rosarians, but it must, of course, be taken only as indicating that the varieties mentioned were particularly well, or particularly numerously represented on the show tables, no account being taken of the habit ol the variety, or whether the grower may expect more than fifty or less than 5 per cent. of top quality blooms on any given day.

— The Garden Rose Vote. —

Much more interest was shown in the compilation of this list, though the result can hardly be said to have been as satisfactory, It is inevitable in a case of this sort that the voice of the general public, or rather that of the amateur gardener who loves the rose more than he knows her, should swamp that of those who are better qualified by experience and knowledge to express an opinion. The list is in every sense a "popular" one, and being so is a little out of date. One can still trace the famous "Argus" twelve. Its chief fault is perhaps its lack of variety and contrast in color, there are also others. There are, for instance, certain faults, such as weak growth (except perhaps for very small gardens), shy blooming, poor carriage of bloom and perhaps scentlessness should be added, which, together, or even singly, disqualify a rose for this purpose. Judged by this standard, at least half of the following twelve "best garden roses" voted by the public are found wanting:—

1. Belle Siebreicht—Bright pink.
2. Madam Abel Chatenay—Salmon pink.
3. La France—Silvery pink.
4. White Maman Cochet—Cream-tipped pink.
5. Lyon Rose—Copper rose.
6. K. A. Victoria—Cream.
7. F. K. Druschki—White.
8. Maman Cochet—Pink-shaded carmine.
9. Mrs. Edward Mawley—Pink.
10. The Bride — Cream-tipped pink.
11. Antoine Rivorie—Flesh pink.
12. Madam Jules Grolez—China pink.

The "Mail" Editor, in an interesting and helpful criticism, takes out seven, the culprits being La France, Maman Cochet, White Maman Cochet, Lyon, K. A. Victoria, Frau Karl Druschki, and Mrs. Edward Mawley. He substitutes—

Laurent Carle—Bright crimson.

Mrs. Aaron Ward—Orange yellow.

Prince de Bulgarie—Flesh, base of petals orange.

Lady Battersea — Scarlet-shaded pink.

Mrs. David McKie—Creamy yellow.

Souvenir Marie de Zyas—Deep carmine.

What a difference they make from the color point of view alone, how bright and distinctive a bed of this twelve would make as compared to one of the other. We hope we shall not be treading on four hundred and forty corns in saying that the alternative list simply looses the other. Even then we would want some space for say climbing Niphetos, because a garden of roses, however small, or a bowl of roses, would not be complete without the indispensable white. Grand old Cloth of Gold came thirteenth on the list, probably if a rose census were taken it would be found that this old favourite actually headed the list in Adelaide and suburbs. Just call to mind the many gardens where a bonny big bush of Cloth of Gold has been an outstanding and charming feature for the past weeks. Gruss en Teplitz came fourteenth and most gardeners who know this free-flowering, nicely foliaged, brilliantly calored and perhaps most fragrant of all roses, would have liked to see it squeeze into the twelve. In any case it ought to squeeze into every garden, however small. Bardon Job finds no place, but the grower should do just a little more squeezing, for this semi-climing rose, whose radiant blooms of velvet flushed crimson comes as one of the earliest spring promises of the glories of the rose garden which are to come.

One would like, too to put in a word for Dorothy Perkins, for arch

or pillar, most beautiful of the cluster roses, blooming, it is true, for all too short a period, but beautiful in foliage almost all the year. Then there is Macartney—but if we go on we shall end by squeezing the gardener out of his garden.

Rose Lists.

It is welcome news that the Rose Society have arranged for a Committee of Experts, professional and amateur, to draw up a list of show and garden roses and that another Plebescite is to be arranged in connection therewith. It would be of interest, we think, if the gentlemen who have kindly undertaken to do this, were to go further, and give the pub,ic the benefit of their opinion of the best rose for special purposes—as for instance, Arch, Tripod, and Pillar roses. Roses of suitable habit for lightly screening a verandah such as Reine Marie Henriette, which is about the best we know for this purpose.

The Choice of a Trustee.

Sooner or later in the life of every man who takes his responsibilities seriously, the question is certain to arise: "Whom shall I name as trustee of my will?" and the decision is often a troublesome one. "What I want," he reasons, "is someone in whom I can place the utmost reliance and trust, and with whom my money will be absolutely safe. He must, moreover, be one who knows something of the intricacies of trust business, and he must have sufficient leisure time to properly attend to it. He should also be a man of independent means, as some security against breaches of trust and consequent loss of funds." But it is exceedingly difficult to find anyone who seems to meet all requirements, and the fact that his executor or trustee will have also control of funds which may be the only means of subsistence of his widow and children, make him hesitate to appoint anyone who fails to come up to the standard he has fixed. This is only to be expected, for the measure of confidence in a trustee is very great—greater, in fact, than in one's Banker, for, with the latter, the business can at any time be removed from him, which state of affairs does not exist with one's trustee. The proposing testator has not, however, overcome all his difficulties if he finds someone who seems to embody all that is necessary to fill the position properly. When approached, he will, if the gentleman of his choice be a wise man, be met with a refusal to accept the many responsibilities and liabilities of the position, as being altogether out of comparison with the small commission which, later on, the court will allow him. If, however, this difficulty is overcome, there is still the knowledge that the risks of life might overtake the trustee before he has completed his duties, when not only will considerable expense be entailed in the appointment of a seccessor, but such successor may be a most unsuitable man—one, in fact, whom the testator would absolutely refuse to trust, if the appointment were in his own hands. There is always a way out of the difficulty, but it is not in the appointment of an individual, but of a company. The Executor Trustee and Agency Company of South Australia, Ltd., Grenfell Street, Adelaide, was specially formed to meet such cases. It devotes itself entirely to the work of Trustee, Executor Administrator, Attorney under Power, Agent, etc., and is debarred by its Act of Parliament from engaging in other business, and especially in anything of a speculative nature. It meets all the requirements of the most exacting testator. The security it offers makes it comparable with the strong bank or assurance company to which his money was, without hesitation, entrusted, and comprises £109,273 capital and reserves. The amount at credit of estate, trusts, and clients reaches two and a half million sterling, which speaks for itself as to the popularity and high standing possessed by the company under review. The appointment of the company obviates all expense of appointing a new trustee, for it will not die or leave the country, but is always on hand to attend to its duties, and is available at all times to its clients. Its commission rates are extremely low, lower, in fact, than the court often allows to individual trustees, and are only remunerative by reason of the large number of trusts managed. The office of the company is at 22 Grenfell Street, Adelaide, the manager of which is Mr. W. W. Carter, whose wide experience and successful management stands him in good stead. Further information as to the company's methods, charges, etc., will gladly be supplied on application.

It will be of interest to our readers to know that Messrs. G. A. Prevost and Company, of Steamship Buildings, Adelaide, are acting as agents for the Harvey Orchard Ploughs and Cultivators. This is a line of implement with which fruit growers will be well advised to make themselves acquainted. Another interesting item is the Nielsen Horsepower Sprayer, in which, by an ingenious arrangement of the gearing, the motive horsepower is at the same time used to provide the pumping force — by this means it is obvious that considerable saving in labour is possible. We can recommend our readers to apply to this firm for further particulars.

Some National Flower Emblems.

Beautiful flowers, and even leaves, have long been emblematic. The highest honour for a Roman soldier was a simple crown of oak leaves. The oak, indeed, was looked upon as an emblem of patriotism. The laurel is the emblem of glory, and in the Pythian games the victor was crowned with leaves of that plant. Similarly the Olympian winner received a garland of wild olives. Of late years a very complicated "language of flowers" has been constructed, which often verges into nonsense, but we need not regret that the rose is the emblem of "love and beauty," the forget-me-not of "constancy," the lily of "purity," the violet of "modesty," the daisy and white violet of "innocence," the rosemary of "remembrance," and so on.

Now let us consider in detail the floral emblems of countries. Coming to England the rose is certainly the national flower, just as, the oak is the national tree. The ancients suspended a rose over the table at feasts, intimating to the assembled guests that the conversation was to be held sacred, and not to be repeated elsewhere —hence the expression, "sub rosa." At one time in English history the rose was the emblem of strife. Edward I. first wore the "red rose," and Edmund Langley, the Duke of York, the "white." In the Wars of the Roses, Henry VI., of Lancaster, had the red rose and Edward IV. of York the white one, till these devastating wars were happily closed by the marriage of Henry VII. of Lancaster with Elizabeth of York. Flowers in England have been used as a party emblems. The primrose of the Conservatives will at once come into mind in this connection. Flowers were often the badge of noble families. The broom, or "planta genista" being that of the Plantagenets, for example. Little Wales has a "Leek," and its associations are most honourable. On March 1st, 1240, the Welsh under Cadwalla each plucked a leek and placed it in their caps, as a badge, before fighting the Englishmen, on whom they inflicted a good beating. The "thistle" of Scotland is stated to date from the reign of Malcolm II. in 1010. The wily Scots had filled the castle moat with thistles instead of water, and so, when the invading Danes plunged in, in the dark, they pricked their legs and were discomfited. Hence the Scotch motto, "Nemo me impune lacessit," which means, "You let me alone." At the same time, it seems that there is no proof that the thistle was adopted as the symbol of Scotland earlier than the middle of the 15th century. Burns sang of—

"The rough bur-thistle spreading wide
Amang the bearded bear,
I turned my wedding hank aside,
and spar'd the symbol dear."

These being the sentiments of a good Scotman, you will see that it would be wrong to expect a man of that nationality to have his heart in his work if you set him to clear some of our badly-infested thistle country. Nor would I lacerate the feelings of an Englishman by setting him to eradicate that beautiful and encroaching rose, the "sweet briar." As to the shamrock, it has never been suggested that it is a nuisance to anybody. Concerning the "shamrock," I am indebted for much that follows to Nathaniel Colgan, who wrote an excellent essay on the subject in the Journal of the Royal Society of Antiquarians of Ireland, 1896. No reference to the

shamrock is known to occur in any book of earlier date than 1570. In 1681 it first appeared in literature as a badge or emblem. The legend of St. Patrick and the Shamrock first occurs in English literature early in the 18th century. From the earliest Christian times, the architectural trefoil has been an emblem of the Trinity, and it seems probable, therefore, that the Trinity legend of the Shamrock has been derived in comparatively recent times from the trefoil in ancient art.

" Oh, the shamrock—the green immortal shamrock.
Chosen leaf of bard and chief,
Old Erin's native shamrock."—(Moore).

As to what the shamrock really is we are not certain, since there are several plants which answer to the description. I have been credibly informed that the rose, thistle, and shamrock are not associated with the Royal Arms of England for even decorative purposes. The roses, when drawn correctly, are, as defined by an Order in Council, and by the practice of two hundred years at least, and are not ordinary botanical flowers, but are always displayed red within white, and white within red alternately, without stalk and leaf. The "thistle" is the crest of the royal family of Scotland. The rose, shamrock, and thistle, are kept outside the coat af arms, and are known as the Badge of Union.

You all remember the "fleur-de-lis," or lily of France, a very ancient emblem largely used for decorative purposes. It was called "Flower de Luce" by old English writers. Many people think that it is derived from the iris or flag but as a matter of fact, its origin is not free from doubt, and it may not have been derived from a flower at all. George III. was the the last King of England, who carried the French lilies on his shield. The lilies of France were first assumed by Edward III. in the year 1340, and continued in use until 1801, though except in one reign during that long period it was a mere pretence and shadow of sovereignty. Violets are the flowers of the Bounapart dynasty; after the flight of the first Napoleon they were symbolical of his expected "return in the spring." The violet was also the flower of old Athens.

The blue cornflower, or Kaiserblume of Germany dates from the terrible times of the Napoleonic wars. It was the favourite flower of Queen Louise, who tried to comfort her starving people. After the war of 1870, William I., Emperor of United Germany, stated that it was his favourite flower, as well as that of his mother, Queen Louise, and hence it has had a great vogue, being pictorially represented everywhere. Nevertheless, it has not been accepted as the national flower of Germany. If Germany has a national plant it probably shares the oak of England.

The pomegranite is the Spanish national emblem, having previously been the emblem of Moorish Grenada. You will remember that the Moors were finally driven from Spain in the 15th century.

The national flower of Italy (I do not know whether by sanction of the legislature) is the "Garolano" or red carnation. It is the commonest flower in Italy, and perhaps Sicily.

You all have read of the sacred lotus of Egypt, "Nelumbium," and have often seen it growning in the ponds of the Botanic Gardens. It still has a sacred significance in India. The chrysanthemum is the national flower of Japan, and a day, is set apart in each year as the festival of this flower. The Japanese view flowers with a feeling akin to adoration. You will remember that they make special trips to see the cherry, apple, etc., trees in blossom. The chrysanthemum is a very common decorative motif. It is embroidered on the flags and banners. Note the flags on their warships—here we have a free treatment of the chrysanthemum. It is printed on important papers. It is stamped on their silks, and has decorated their best porcelain for hundreds of years.

Now we come to the United States, a country which, like ours, is a federation of States. There is no national floral emblem for the Country as a whole, but the legislatures of certain States have taken action, decreeing certain flowers to be State emblems. Thus, that of Nebraska is the Golden Rod; Utah, the Sedge lily, Vermont, the red clover; Oregon, the native Grape; Michigan, the apple blossom; Maine, the pine tassel and cone; Montana, the bitter root; Colorado, the white and blue columbine; Oklahama, the mistletoe; and Iowa, the wild rose.

The sunflower is the State flower of Kansas, though not by legislative enactment, and other States have State flowers, so rerorded by votes of the school children and other means. The cactus or prickly pear is the floral emblem of Mexico.

We in Australia have not agreed upon a national floral emblem. When we do, it will probably be eucalyptus or wattle blossom. These occur abundantly in all the States, and it would never do to adopt, as an Australian emblem, a flower confined to one State and perhaps to a small portion of that.

New South Wales is our State—the parent—and many people, who have given thought to the matter, say that the "Waratah" is the national flower for New South Wales. It is a gorgeous flower, but it is necessary to point out that it is confined to a comparatively small area in the coastal strip. So that a man at Bourke, for example, would often have to go without his national flower supposing it were decreed as such. I do not doubt that many New South Wales people have never seen a Waratah.

I am informed that no official cognizance or authority exists for the employment of this flower, although it is frequently so utilized for popular and decorative purposes. There is no gazettal here, or acknowledgment in England, of this flower as part of our crest, badge, arms or bearings of any kind. With the sole exception of the Queensland seal, where the sugar cane is employed in a very minor way as a sort of secondary ornament round the badges of the State, I do not know of any case in Australia in which a plant is officially recognised. Surely this ought not to be. I hope that we shall all live to see a flower selected as a "national emblem" for Australia and for New South Wales. We have one of the most interesting and beautiful floras in the world, and it may be that the choice of a floral emblem will direct attention in every household throughout the land to our beautiful flowers. An address by Mr. J. H. Maiden, of the Sydney Botanical Gardens.

"They say that goats haven't got much brains," remarked Jack, meditatively; "yet I don't know. I noticed one devouring a newspaper this morning, and he seemed to me to be taking in every word."

Readers! **Can you write us something about your methods of breeding, rearing, and managing Live Stock? Let us have it if it will only fill the back of a Post card.**

Home-Made Tools for the Amateur Gardener.

One of the difficulties which confronts the amateur gardener in the laying out and working of the garden arises from the lack of proper or convenient tools. It is not always possible to have all one would wish in this line, especially if one has but a limited amount to spend on the garden, and wishes to apply a large portion of this to the purchase of plants, seeds, and bulbs; it, therefore, becomes necessary to economise, as far as possible, in the purchase of other accessories. There are, however, few tools beyond the spade, rake, and trowel, and a good, reliable wheelbarrow, but what can be evolved by one's own ingenuity and skill from the material already at hand on the place.

One of the first things which will be needed in the planting of the garden will be the garden line and reel; this may be substituted for by a shilling ball of stout twine and a couple of pointed stakes a couple of feet long, but for work not involving too many feet the pole and pegs will be found more practical; this is produced by taking a long strip of wood two or three inches in diameter and boring holes in it at a distance of a foot apart along the entire length. In the first hole at one end a stake two feet is fitted, the hole for this being large enough for the peg to work freely in its socket, the head of the peg being cut away enough to leave a shoulder for the pole to rest on, and the extreme end having a nail driven through to prevent the pole slipping off. The remaining holes may be somewhat smaller, as the marking pegs do not need to be as large as the stakes at the head, and may be tapered somewhat at the end, so that it may be driven in firmly, or it may have a shoulder and be secured in the same way as the head peg, but the tapered peg is the more simple.

In use the head peg is driven firmly into the ground where the centre of a round bed is to be, the marking peg inserted in a hole which corresponds with the desired diameter of the bed—three feet if the bed is to be six feet in diameter—and the point held firmly on the ground as the end is carried around the circumference of the bed. Where the bed forms the centre of a circular garden the peg should be removed a distance of three feet or more, according to the width desired for the paths and these marked out in the same way. Nor is the marking out of round beds all which may be accomplished by this handy tool, as straight beds may also be marked by setting the stake at one corner and the marking peg at the other, and marking off distances by the figures on the pole.

An oval bed presents more difficulties to the amateur than almost any other form, but may be easily managed by the use of a line and two stakes. First find the length and diameter of the bed desired and drive two stakes in each side of the long way of a bed at a distance from the edge according to whether the bed is to be a broad or narrow oval. The farther the stakes are set from the edge the broader will be the oval. For instance, if a six-foot-long oval is desired, setting the stakes a foot from either end and using a cord eleven feet long will give an oval three and a half feet wide—a very pretty size. The cord is made long enough to go around these stakes and reach to the outside of the bed an one side only and tied securely, so that it can not stretch or slip, or the pegs should be driven into the ground very firmly. The cord is slipped over these pegs, not attached in any way, and a marking peg slipped inside the cord and the cord drawn out to its limit and the ground marked in the usual way. The farther the pegs are set from the edge of the beds the wider will the oval be, so that beds of almost any diameter, from a circle down to a narrow oval, may be marked in this way.

Sometimes in laying out the garden it is best to mark the paths and let the beds fall within this circumscribed area, and a tool for this purpose sometimes comes very handy, and one may be made of a long pole with a three, four, or five-foot piece made to slide thereon by cutting a slot in it large enough to hold the pole and let it work freely. In this cross-piece holes are bored as in the pole for marking beds, and sharp pegs thrust to mark the limits of the paths.

A handy tool in the garden is a carrier for plants which are to be moved from work-bench to house or garden, or from hotbed to garden. This consists of a thin, but strong board for bottom, with narrow strips of wood nailed on the sides, and a handle made from barrel hoops nailed securely to the bottom and sides. It should be at least a foot wide, and eighteen inches long, and can be made in a few minutes, and will save a great many steps. It will be better before using the hoops to soak them a few hours in water, so that they will bend readily without cracking. Then, as they dry they will fit to position and prove very durable.—By Ida D. Bennett, from "American Homes and Gardens."

Liquid Manure.

Anything in the way of animal manure will do to make liquid manure with, and it does not matter whether it be "green" or old. For preference, we ourselves would use a fresh manure. In the new condition its manure value is greater than when it is old and dry. Cow droppings of to-day are ever so much better than those of yesterday, or yesterday-week.

The object of using liquid manure is to put the plant food in a more or less soluble form. The strength of the liquid should be regulated according to the requirements and size of the plants. If you use horse or cow manure, use the liquid no darker in colour than weak tea. Far better weak than strong. Weak and often is the homoeopathists' way. Let it be yours also. Half fill a sugar bag with whatever you intend using, tie it up, and drop it into a cask, letting it soak a day. Never allow the "brew" to remain too long in the cask, in case your neighbour gets to know of it. If possible, always arrange the barrels to the leeward of the man who lives next door. If he be a policeman, put an air-tight, or perfume-tight, lid on the top. Should an inspector of nuisances live within a block of you, be a little more careful still.

Soot is a particularly good medium for making liquid manure,

either for roses or other plant life. It contains a small percentage of sulphate of ammonia, and is useful on this account. Put the dry soot into a small bag, and treat it the same as the cow manure.

Never give liquid manure to any plant that is dry at the roots. Always water the roses first, and give the stimulant afterwards.

In dealing with pot plants this rule should never be broken. A dose of liquid once a week will do all that is necessary.

The time to begin using liquids is from the beginning of the new growth until the flower buds are just about ready to break. Too much manure, aod too frequent doses, will make everything rather rank. Rather err on the side of too little, than give too much.

Fowl Manure.

A well known grower of fine roses writes about fowl manure—

This manure is one of the best manures we have. We never have any hesitation in using all we can lay our hands (no, our spade) on. Our plan is to scatter the droppings over the rose bed, being careful not to let too much get round the stems, and to let air, watering, and rain (when the rain favours us), take the sting out of the manure. This very soon happens. Later on we dig it in, and think we have done well, especially if the dose has been a fairly good one.

You need need never be afraid of fowl manure. The reason why amateurs are chary of this fertilser we have never been able to gather.

To dig the droppings into the bed at once would be rather a mistake. The airing of it does quite as well as mixing with its own weight of soil or sand.

For the cultivation of soft and hard-wooded greenhouse plants, fowl manures are invaluable in liquid form, but the original soak should be broken down with five times its own measure of water.

The Budding of Roses.

An amateur rosarian should always have a few stock handy for "working" or budding himself. Perhaps he may want to duplicate some of his own varieties, or he might have the chance of getting a bud or two of some coveted novelty from a brother rosarian, and if the stock be ready in his own garden all difficulties disappear. The operation of budding is simple and easily learnt, especially if one has the chance of actually seeing it done.

It is essential that the stock be ready—that is, the bark must come away from the wood easily, showing that the sap is running. The only things necessary are a budding knife (cost two shillings), which must be sharp, some budding cotton (threepence a ball), and a deft pair of hands.

Commence by carefully removing leaves and thorns for four inches along the stock, where the bud is to be inserted. Then the bud must be prepared. This is done by taking the cutting from which the bud is to be taken, and insert the knife about half-an-inch below the bud, cutting near half-way into the wood of the shoot, continuing it with one clean slanting cut, about half-an-inch or more above the bud, so deep as to take off part of the wood along with in; then with the thumb and finger, or point of the knife, slip the woody part of the bud out, and observe if a tiny piece of wood still remains over what is called the eye of the bud, if it does, then the bud is perfect, but if not, then it is useless, and another bud must be cut. When this is done, place it in the mouth, and with the knife make a horizontal cut across the branch to be budded, right through the bark to the hard woody part then make a slit downward perpendicularly to the first cut, also going through to the wood, then neatly, with the flattened handle of the knife, separate the bark from the wood. Into this incision slip the prepared bud, right down so that the leaf stalk is about half-an-inch below the first horizontal cut. The next operation is to cut off the top part of the "shield," as the inserted bark is called, even with the horizontal cut first made, in order that the bark of the stock and the bark of the shield shall exactly coincide at the transverse cut of both.

Then commencing from the bottom tie the two together with the budding cotton, proceeding upward, closely round every part except the eye of the bud itself, and continue it a little above the horizontal cut, not too tight, but firm enough to keep the parts well together and exclude the air. At the end of ten days the tie may be loosened, and if the bud has taken, the tiny piece of leaf stalk will fall off and the bud will appear green, but if it has failed it will be dried looking and black.

Keep the stock well watered and all growth, other than that of the inserted bud, cut back. Very little practice will enable one to be most successful in this interesting operation. A very pretty effect can be secured by working various kinds of Roses on to one. For instance, most of us have a yellow Banksia growing on trellis or arch, and this Rose is a first-class stock. The beauty of the Banksia will be increased by inserting on various parts of it buds of Reine Marie Henriette, Climbing Perle des Jardins, Noella Nabonnand, Bardon Job, Monsieur Desir, Climbing La France, and many others.

THE 'WELLCOME' PHOTOGRAPHIC EXPOSURE RECORD AND DIARY 1913

To boil down into one handy pocket volume the accumulated photographic wisdom of the year and of preceding years is a work of signal utility and one which should win the gratitude of all photographers. Such a task has been accomplished in the 1913 Edition of the Wellcome Photographic Exposure Record which is just published. Among the most novel features are the descriptions of new methods of toning prints green and blue, by the use of 'Tabloid' toners. There are also some interesting new notes on the technique of colour photography, and on modern methods in development, including a table of times, temperatures and dilutions for varying tones by simple development with 'Rytol.' The 'Wellcome' Exposure Calculator, a mechanical device which permits the exposure for any subject under any conditions to be gauged with remarkable accuracy and ease, is attached to the cover and adds greatly to the practical value of the book. The 'Wellcome' Exposure Record may be obtained from all photographic dealers and booksellers, and at all railway bookstalls. Price in Sydney is 1/3.

Druggist—"Do you want the soap scented?" Kid—"No, I'll take it with me."

Fern Fructification.

By Charles T. Druery in "The Gardeners' Magazine."

Despite the immense number of species of ferns and their great diversity of form and habits, they are characterised throughout by the production of microscopic spores, contained as a rule in very small receptacles or spore cases, and in most instances these are assembled in masses of small dimensions, i.e., in dot-like heaps or slender lines. In this respect they differ very markedly from flowering plants, which, as we know, display a wonderful diversity in the size and character of their seed vessels or fruits, and even in the individual seeds themselves, which range in size from very tiny ones up to huge ones like the Seychelles cocoanut, as large as a man's head.

There is, moreover, an essential difference between the so-called fructification of the two classes of plants, since while the flowering plants produce seeds in which, by a process of fertilisation, perfect embryo plants exist, the fern spore is not so constituted, but in a single envelope or shell, and only capable of producing a small green scale-like growth termed a prothallus, upon which subsequently the equivalents of flowers of two sexes are formed, by the interaction of which a seed (or seeds) is fertilised and developed, and thus rendered capable, like other seeds, of protruding roots and fronds, and yielding a fresh generation.

These pseudo-flowers are quite microscopic in size, and are produced on the under side of the little scale aforesaid, the male flowers being scattered as small spherical bodies over the greater part of the surface amid the tiny hairs which serve as roots, while the female flowers form a little cluster on a thickened cushion close to the indentation of the heart-shaped scale. At the base of each of these female flowers there is an embryo seed. The spherical male flowers, when ripe, burst open and liberate a great number of very minute tadpole-like bodies (antherozoids), and as the undersurface of the scale is usually covered with a dew-like deposit of water, these little bodies are enabled to swim about in it, and some of them eventually reach the little cluster aforesaid, and by passing down the open neck of the archebonia or female flowers, reach the embryo seed and fertilise it. A remarkable feature in this operation is that the antherozoids actually steer their way in the right direct on, thus displaying volition. The seed then swells, protrudes a rootlet and a first frond, and the young fern is thus launched into existence.

We thus perceive that the main difference between a fern and a flowering plant proper is the production of a detached spore as an intermediate stage between the spore-bearing fern, and the seed-bearing scale. This is the normal process of all ferns without exception, but cases have been discovered in which this intermediate stage is cut out, as it were, the fern frond developing the scale direct either at the tips of its divisions or dorsally where the spores should be, and although these scales must be brought into contact with the soil to complete their reproductive functions, nevertheless, to a certain extent, they elevate the fern concerned to the level of a flowering plant proper, a detachable seed alone being lacking. This short cut is termed apospory. Another short cut, termed apogamy, is arrived at in some cases by a non-sexual bud being formed on the scale usually in the place where the female flowers should be, and this develops into a fern without any sexual interaction occurring.

From a consideration of the normal process of fertilisation we see that the antherozoids are equivalent to pollen grains, and in the Maidenhair tree (Salisburia adiantifolia) we find a still existent link between ferns and flowering plants, since not only has this tree preserved outward evidence of oribin, in the shape of leaves exactly resembling the divisions of Maidenhair hair fronds but our Japanese friends have discovered that its pollen tubes, just before they reach the embryo seeds, actually liberate fern-like antherozoids to complete the fertilising process; showing that after all the pollen tube is simply an elongated channel evolved to enable the distance between the flower stigma and the embryo seed to be traversed by the modified antherozoid present in the pollen grain. Drier conditions, no doubt, led to this, at the same time as they led to the general evolution of flowering plants from primary algae, through ferns and fern allies.

We may now turn to the forms of fructification as developed upon fern fronds in lieu of flowers and seeds, i.e., the varied arrangement of the spores. This, however, is so diverse that we cannot do more in this paper than allude to a few of the types. Broadly speaking these fall into eight categories:— 1. The round or oval uncovered or covered patches of spores which distinguish the Polypodium genus, and the Shield ferns and Lastreas. 2. The arrangement in lines along the veins, as in the Aspleniums. 3. Continuous lines along the margin as in the Pteris family. 4. Discontinuous marginal patches as in the Adiantums. 5. General distribution in sheets over the backs of the fronds, as in the Platyceriums or Stag's Horn Ferns. 6. Aggregation of the spores on special parts of the fronds, as in Osmunda and Anemia. 7. Concentration of the spores to entirely specialised fronds, as in Blechnum, Lomaria, Struthiopteris, and, 8. Bearing the spores in receptacles attached to the edges of the frond divisions, as in Davallia, and Trichomanes.

Besides these modss of distribution or aggregation, several of the classes are varied by a protective arrangement called the indusium, which accompanies the spore

patches, and in their young state envelops them. This, naturally, is adapted to the shape of the spore heap, being round, kidney shaped or dome shaped, in association with dot-like heaps.

In the great majority of cases the little vessels (sporangia) containing the spores are remarkably similar in make despite great differences in their arrangement. They consist of small oval capsules with a ribbed stalk, which passes as a ridge up the back, over the top, and half-way down the other side, like the ridge on a fireman's helmet. When the spores are ripe, this ridge contracts and induces such a strain that at length it tears the capsule open at its terminal point and, after bending slowly backwards for some distance, suddenly jerks the upper half so violently to the rear, that the spores are scattered far and wide by the shock. In some few genera the ring runs nearly horizontally round the capsule, or exists only in a rudimentary form, but in most the capsules are so similar in make that it is impossible to determine their species by isolated specimens. A capsule may contain on an average fifty or sixty spores, and as a spore heap may contain hundreds or even thousands of capsules, the annual crop of an ordinary sized fern may be estimated at millions, and even many millions of spores. The capsules are usually brown, and the spores a darker brown, but both vary in colour, and the pores vary in make far more than the capsules, some being smoothly oval, some ridged, and so on. In the Osmunda the capsules and spores are bright green, even when ripe, and in Polypodium vulgare they are a brilliant orange-yellow, like gold dust.

We have already seen that the fructification of ferns is provided for on extremely liberal scale, but this numerical liberality as regards the spores is largely increased by the fact that not only is the little green scale produced from the spore capable of producing more than one fern, since it has a cluster of embryo seeds embedded in it, but it has also in many cases the faculty of budding out into other scales, each one of which is complete in its reproductive capacity. Hence the spore may, though it rarely does, produce a number of ferns instead of merely one, as a seed would do. From all these considerations we arrive at the fact that the potential annual offspring of a single large adult fern may be estimated at hundreds of millions, a fructification which is indeed worthy of the name, and leaves all flowering plants far in the rear.

Capillary Attraction.

No physical property is more familiar than that of capillarity, or capillary attraction. When a piece of sugar is held with one corner dipping in a cup of coffee, the brown liquid quickly suffuses the lump. When a fresh wick is allowed to depend into the oil-reservoir of a lamp, the fluid speedily travels up the fabric. When a sheet of blotting paper comes in contact with a drop of ink, the latter rushes into it with a celerity that would astonish us were we not familiar with the sight from our copy-book days onwards. These are instances of capillarity, and the phenomenon is dependent upon the presence of innumerable very fine tubes (Latin, capillus, a hair). As the internal diameter of these narrow tubes increases, so does the power of capillary attraction diminish. Myriads of such tubes exist in the soil; and the finer the soil the more delicate, and consequently the more efficient, do these tubes become. On the other hand, the coarser a soil is, and the more inferior the tilth, the more do the delicate narrow tubes give place to others of wider bore.

However dry and parched a cultivated soil may happen to be, it is not necessary to dig very deeply before moist soil is reached. By digging to a much greater depth the water table, or line of water level in that spot, will be found; and it will be seen that from the water-level upwards the earth is moist, though the actual soil has lost all, or nearly all, its moisture. Why should it not be moist up to the surface? Is it because the surface is so largely exposed to evaporation? Partly so, no doubt; but it is a question not so much of evaporation as of capillarity, that is, of tilth. The capillary tubes, having lost most of their moisture by evaporation, have crumbled to form other more open tubes, too broad for the water to travel along, and hence the surface soil has been deprived of those myriads of minute invisible conduits which would have enabled it to continuously draw its supplies of moisture from the reservoir below. Had the surface soil been kept in a state of fine tilth—and this can be done by stirring it sufficiently frequently—the moisture would have travelled up from below to replace that which evaporated.

When rain falls upon the soil, some of it sinks down to replenish the stores below; but during the season of active growth, and particularly in a droughty season, there is a movement of moisture from below upwards. This moisture replaces that lost at the surface by evaporation; and its direction is such that it tends to keep the soluble plant food where it is wanted, that is, about the roots of the plants. If enough water be poured into a saucer in which stands a flower-pot full of earth, the surface of this mould will at length become moist, and the water will necessarily have travelled upwards by capillarity. But here another important point comes in. If all the capillary tubes are open to the surface, evaporation can proceed from them so freely that the underground store of moisture may be insufficient to supply the continuous demand. Hence, again, it is desirable to keep the surface soil by frequent stirring, in such a state that the capillary tubes are broken or interrupted a little below the surface. In this case the mere superficial covering of mould acts as a soil mulch; and, like a layer of leaves, or grass, or farmyard manure, it protects the moisture beneath. Hence, an occasional slight stirring of the superficial soils serves to conserve rather than to dissipate the underlying moisture. —From Fream's "Soils and their Properties."

Father (impressively): Suppose I shodld be taken away suddenly, what would become of your my boy?

Irreverent Son: I'd stay here. The question is, what would become of you?

Vegetable Garden.

Notes for December.

— Some Hints for Warm Districts with Water. —

Where water is not available, the gardener may as well keep his seed as plant it now, except in picked moist places. Where he can water, it is not too late to plant melons, cucumbers, tomatoes, capsicums, and French beans. Indeed, cucumbers can be planted with success in Adelaide up to the new year, and French beans up to the end of January, and still have time to give a late and good crop. The new year is, however, late enough as a rule. The latter sowing producing beans until June. Plenty of water and manure are the secrets of good bean and cucumber plants.

Give plenty of water to Jerusalem artichokes, and if the ground is not rich give them liquid manure with the water. They are gross feeders, and will take plenty of feeding.

Now is the important time to feed and water the asparagus beds. Give them a top-dressing of nitrate of soda or sulphate of ammonia at the rate of 2lbs. to the rod, and plenty of water. It must be kept in mind that the next season's crop of shoots are being formed now, and on the feeding which you give the beds this season will depend the crop you will get next. The grower must not think that because he stops cutting the need for attention is over. Feed now, water now, and thus produce strong, vigorous plants, which will give fat shoots next spring. This rule applies to many things besides asparagus; but, of course, only to perennial plants.

As the fruit flowers begin to mature on melons, trombones, pumpkins, marrows, and cucumbers, it is often a good plan to pinch out the ends of the side runners. Only the tender end need be removed; but this will often result in a better setting of fruit. It is also a good plan when fine fruit is desired to limit the number of runners and the number of fruits on each. Some readers may not know that there are two kinds of flowers on melon and cucumber plants. The male flowers have short stalks, and are provided with stamens, but no pistils. The female flowers have long stalks, with rudimentary melons or cucumbers, and have pistils, but no stamens. It is these only which can develop into fruits.

It is not necessary to fracture the necks of onions to cause them to "bulb" well. The bulb is chiefly formed from the nutrient material in the green plant. Bending the top over may hasten the passing of the nutr ents, and thus cause earlier maturity, but if so it will be at the cost of full development. Such work is quite unnecessary, and often injurious. If plants start to run to seed nip off the flower heads as quickly as possible, and the onion will swell and mature properly. It must be remembered that the onion is naturally a bulbous biennial. The first season it devotes all its energies to first forming leaves in the ordinary way, and then to storing nutrient matter in a bulb, which we call an onion. The second season the material so stored is used in developing the flower, stalk flower, and finally the seed. In our climate these two seasons may be crowhed into one year, and when the plants are grown out of season there is a tendency that way; but if the flower head be nipped off as soon as it appears a normal development will take place.

In growing summer vegetables in dry districts or anywhere where water has to be applied and the drainage is good, I find it a satisfactory plan to make the vegetable bed rather lower than the surrounding level of the garden. This plan saves water as well as renders its application easier. In wet soil the opposite plan is to be advised. Under such conditions the bed should be raised to ensure good drainage.

French beans, cucumbers, and sweet melons like plenty of moisture and plenty of rich manure. They should be plented on very rich soil, or have liberal doses of liquid manure. The marrow may be treated the same way, but water melons and pie melons are not gross feeders, and give best results in land which has not been overdosed with stable manure, and is not too wet. A sandy patch of natural soil with a moist subsoil suits them splendidly.

— What May be done in December. —

Early Districts.—Sow seed of salad plants only in suitable damp places—lettuce, radish, mustard, cress, onions, etc. Supply liquid manure to growing crops. Dig potatoes and gather onions as they ripen, and don't expose them to the sun. Plant successions of French beans and cucumbers. Give sweet melons water and liquid manure, but not too much if high quality melons are required; too much water gives watery fruit. Stop cutting asparagus, but give water to mature tops. Towards the end of the month prepare seed beds for raising early cabbage, cauliflower, and onion plants.

Late Cool Districts.—All kinds of vegetables may be planted with success. Plant out cabbages, cauliflowers, and celery, plant potatoes. Try late sowings of melons, cucumbers. Sow peas, beans, carrots, parsnips, turnips, beet. Apply water as required. Keep the soil stirred and weeds down.

Tomato Culture.

A large and very successful grower writes:—"The tomato is of somewhat easy culture, especially if you will bear in mind and act upon one or two rules. Briefly stated, they are as follow:—Avoid starting your crop in a soil rich with recent manure; give plenty of room for each plant, and keep the roots well supplied with moisture by heavy waterings while the fruits are swelling. These are three cardinal points. Neglect any of them and the result will be as follows:—1. If the soil is very rich, a luxuriant growth of haulm and leaf will be made, and the fruit will be very late in forming. 2. If the plants are over-crowded, the foliage will become mildewed and yellow, and the blossoms instead of forming fruit will drop off. 3. If the plants are allowed to lack water the fruit will be small, and the supply will cease much earlier than should be the case in a well-ordered plantation. The vines thrive best with plenty of air and sunlight between the branches when in full growth. The vines may be either trained to trellises about 5ft. high or allowed to spread themselves out on the ground. Where practicable, and in small gardens, trellises are the best on account of the greater crop obtained by trellising, as well as the neat appearance of the plantation, though of course it entails a little extra trouble. Where they are allowed to spread on the ground, a certain proportion of the fruit is ways lost through rotting during rainy weather. With a trellis it is necessary to tie up all shoots carefully and evenly, or they may

be injured by strong winds. Remove all the lateral growth, that is, the shoots that will appear in the axis of the leaf. Let the leader and sub-leaders be tied and spread out till they cover the trellis and reach the top wire and stake, and then stop these leaders also. By this time if you have attended to the former rules, you should have a fine lot of small fruit swelling. Mind, now is the time to look carefully to the watering, also to commence feeding the crop either with liquid manure, which should be applied weak and frequently, or by putting on a heavy mulch of good stable manure after dressing the beds with some good artificial fertilizer. Watering and the rains will wash the juices down to the roots, and the mulch will prevent the sun from baking the surface of the beds. As the growth progresses it may be found expedient to remove a leaf here and there to allow a free current of air between the branches, but the less of this the better. Watch the bunches of fruit, and if you see any danger of them breaking down carefully loop them up to the trellis, so that the flow of sap along the fruit stems may not be checked, otherwise the fruit will not be so fine. If the cultivator prefers to grow his crop without the aid of supports the growth of the vines should be regulated by carefully stopping each shoot at a joint beyond a bunch of blossom, and continue this process until a fair crop of fruit is set. It is advisable to make two or three successive plantations of tomatoes, in order to keep a supply through the entire summer, rather than depend upon the one sowing for the whole season, as it will generally be found that plants deteriorate after they have carried a fair crop."

Fruit Garden

Notes for the Month.

Budding fruit trees (also Roses) may be done freely this month.

Citrus trees may still be planted out; but as a rule it is better to wait until March before doing so.

After loquat trees have fruited, the old fruit stalks should be cut off down to an active bud.

Young trees planted last winter should have every care. Cultivate well, water if at all necessary and practicable. Rub off all unnecessary shoots as they appear.

Start summer pruning for the forming of fruit spurs on the apple and pear as soon as your conditions will admit.

Keep the centres of all trees open to permit of the proper maturing of the wood. You can tell this by the color of the foliage. It should be of a dark green. Should the leaves inside the tree, and especially near the bottom, be of a light green or yellowish green color, there is not light enough, and enough of the twigs should be removed or cut back to let in the light. If there be lack of light, the twigs and leaves are not only of no use, but are a source of weakness, so that in order to permit some to mature properly all surplus ones must be removed.

Plant Material.

One of the most curious facts which appeal to the student of vegetation is the size and solidity of the structures which Nature manages to create as compared with the amount of really solid material involved. It is by no means an exceptional case to find on analysis that considerably over ninety per cent. is water pure and simple, four or five per cent. of solid material sufficing indeed for gourds, cucumbers, and similar fruits, the great mass of liquid being permeated with cell walls and fibres in such a fashion that its character is almost entirely lost sight of until we evaporate the water and find, as in the case of the loofah gourd, a thin skin filled with a lax, springy network, and with a featherweight replacing that of a heavy massive club. It is doubtless due to such economy that we see such marvellously rapid growth as obtains in the banana, for instance. The immense fruits of the banana, weighing, perhaps, a hundredweight, hanging suspended from a plant fifteen to twenty feet high, with immense leaves and a trunk some two feet in circumference, appeal to the ideas of dwellers in emperate climes as the culminating result of years of growth.

With this our heaviest temperate fruit crops cannot compare, though they have the benefit of presumably a much more extended root system. How a plant can gather in sufficient material from air and soil for such a task is a mystery, and the energy developed in the shape of assimilation and cellular structure is simply marvellous. When, indeed, we take in imagination a birdseye view of the earth's surface, with its immense forests and vast areas covered with lesser vegetation, it becomes difficult to comprehend how the supply of raw material, especially that of the carbonic acid in the air, is maintained age after age in undiminished quantities. A very definite percentage of the carbon thence derived is absorbed as woody material, a part of which is annually locked up in the soil, and hence taken, as it were, out of circulation. The animal world is supposed to restore the balance by reversing the process, i.e., giving out carbonic acid instead of absorbing it, but this operation is out of all proportion in its extent to that which it is supposed to counterbalance, and it might safely be asserted that the vegetable world would continue to thrive though the animal one ceased to exist, for with the very rare exceptions of carnivorous plants, the one appears to be entirely independent of the other; though such independence is not shared by the animal. This remark, however, only holds good so far as the inter-relations with the aerial gas supply is concerned. Natural life would be different from that with which we are acquainted.

The Passion Fruit

Though imported in, comparatively speaking, considerably quantities, and grown to some extent in South Australia, this fruit has not yet attained the position in the popular estimation, which one would have expected for so delicious an addition to our more common fruit supplies. The price, no doubt, and the fact that there is a good deal of irregularity in the supply no doubt accounts for this, but seeing that it is so easily grown and so abundant a cropper, it is a matter of surprise that more growers have not gone in for passion vines on commercial lines. Possibly the fact that it is a short lived plant, that it is often past its prime at an age at which some fruit trees are scarcely in bearing, may partly account for this. On the other hand, it should be remembered, that it fruits the second year from seed, and that a plantation can be renewed at little expense. No home fruit garden should be considered complete without at least a couple of plants, which, if placed in a fairly sheltered position and kept well fed and well watered, will prove to be about the most profitable plants in the garden. Under such conditions they are sometimes extraordinarily prolific, yielding crops which calculated at acre rates would show returns which would make even a successful orange grower envious. Plants can be procured and put out now. They will need some extra care in the way of shading and watering if we got a sudden burst of heat before they are established.

To anyone interested in the matter on bigger lines the following article from the pen of Mr. W. J. Allen, in the N.S.W. Gazette, will be of interest. Mr. Allen writes :—

Although this fruit is not grown so extensively as it should be throughout the many districts on the coast where it will do well, it nevertheless plays quite an important part in some of the young citrus orchards in the County of Cumberland, on the Penang Mountain, and around the Gosford district, where it is frequently planted among the trees. As it begins to bear very early, growers are enabled to make considerably more from this crop than pays for the working of the orchard until the young trees begin to produce crops of fruit, which they invariably do after the third or fourth year.

Generally speaking, the vines are most productive before having attained to four or five years of age. After that period they begin to lose vigour and gradually die out, or cease to be very profitable, and are in consequence removed. The trellis and wires which were used for their support are removed from among the trees, and in many instances are used for a similar purpose in a new portion of the orchard which the grower may be planting out, as a great number of growers who possess fair-sized holdings are continually clearing more land and increasing the size of their orchards.

The passion-vine is found to thrive well on many classes of soil —some so poor that one is led to wonder how anything could be profitably grown on it. On the light sandstone and poorer coastal country there is no other fruit which will give the same return as this, and with proper working and heavy manuring, it is wonderful the amount of fruit that can be taken from an acre of such vines. The area planted is comparatively small, and, in consequence, the fruit usually commands very high prices. As an addition to a fruit salad there is no flavour that can surpass it, and when eaten with cream it rivals the most delicious of strawberries. If this fruit were known in Great Britain and America, I venture to say that there would be an unlimited demand for it, if once we were successful in landing it in those countries in large quantities.

Some few years back a few cases were packed and exported, arriving in London in good condition, but somewhat shrivelled, and, in consequence, when put up at auction were sold at a very low price, owing to the fact that the trade did not know the fruit, and imagined them worthless, owing to their shrivelled appearance. Later on, however, a gentleman from Australia seeing them, introduced them among some of his friends, who thereupon bought them readily at a high price per dozen. However, at the present time the supply is not equal to the demand, and in my opinion if twice the quantity were grown it would command good prices.

— Location of Vineyard. —

In selecting a site for the planting of a vineyard, one of the important points to keep in view is to avoid a district or situation where frosts are at all severe or of frequent occurrence in the winter. There is one thing which this vine will not stand, and that is severe frosts; and the Easter, winter, and spring crops are those which are in most demand. During the summer time there is a superabundance of other fruits, and hence the consumption of the passion-fruit is not so great, but from Easter until Christmas time there is a splendid market for all well grown fruit. It is during part of this time that we have our coldest weather, and a severe frost or two would destroy the whole crop, and in all probability kill the vine back to the root.

The chief feature about the passion-vine, is its habit of producing two crops per annum. The summer crop comes in about February or March, when the market is usually well supplied with other fruits, and prices are necessarily low. The winter crop is ready for pulling when other fruits are are not so plentiful on the market. The practice of the growers, has, therefore, been to secure a heavy winter crop by pruning away the summer crop when about half-grown; or generally speaking, about the month of November. This stimulates the vines to throw out fresh fruiting laterals for the winter.

The next point of importance is to put the land in thorough order before planting, and in places where it is very sour and deficient in lime, which it mostly is on our coastal country where the passion-fruit is grown, it would be advantageous to give the land at least half a ton of good lime to the acre.

— Planting. —

...The vines should be planted out about August or September, when the ground is in good condition.

In raising or purchasing young plants, either secure the seed from

the very best fruit which has been raised on good, strong, healthy vines, or buy plants from a reliable person who has been most careful in his selection, and in this way avoid, as far as possible, starting the vineyard with plants which might perchance have any hereditary weakness.

The seed is sown in February. The rows should be 30 inches to 3 feet apart, and the seed every inch or so in the row, afterwards thinning out to 3 inches apart to make good stocky plants. One half-case of fruit dealt with in this way is sufficient for planting an acre.

The trellis on which the vines are to depend for support might with advantage be erected just before the vines are planted, as by so doing the poles or stakes up which the vines are to climb, until they are firmly fixed to the wires overhead, might be placed in the hole in which the vine is planted, and the top of same secured to wire at the top.

In erecting the trellis, the posts should be 6 feet 6 inches long, firmly set to a depth in the ground of 18 inches, and placed at distances of about 24 feet apart, or at furthest 32 feet in the row. On the tops of these posts are tightly stretched, at a distance of 6 inches apart, two strong No. 8 galvanized iron wires. The rows should run north and south, so that they get the sunlight on both sides. The rows are placed in the centre of the tree rows, or when alone, 10 feet apart, with the vines every 12 feet in the rows, thus requiring about 363 plants to the acre.

The young vine is trained with a single stem up the stakes until it reaches the wires, when it is allowed to throw out from two to four leaders, which are trained to run either way on the wires. As the vine puts forth further growth, the main leaders and laterals are trained along the wires, and after the second summer's growth carry a heavy crop of fruit.

— Manuring. —

Without judicious manuring there are very few districts where the growing of this fruit would prove highly satisfactory, while, on the other hand, those growers who are giving the most attention to this important adjunct are the ones who are making the greatest profits out of the industry. It has become a recognised fact that liberal dressings of manure must be used from the time of planting until the plants cease to be productive. Generally speaking, the stronger and more vigorous the vine the sooner it begins bearing, the better are the crops, the life of the vine will be prolonged, and naturally the plant will be more healthy than if poorly nourished.

On making inquiry among the different growers, I found that scarcely any two of them were using the same mixture. Some, on the lighter soils, were using considerable quantities of blood and bone with a little potash; others were using bone, superphosphate, and potash; while others were using a mixture of nitrate of soda, dried blood, superphosphate and sulphate of potash, etc.; and judging from the appearance of the different vines, all with very gratifying results.

Mr. F. B. Guthrie, Chemist of this Department, gives the following in his Bulletin No. 17—"Formulae for Preparing Fertilisers":—

— For Passion Vines. —

From a number of experiments carried out with the manuring of passion-vines in the Glenorie (Cumberland) district the following mixture was found to be the most satisfactory:—

Quantities to make half a ton—Sulphate of ammonia, 5½ cwt.; Superphosphate, 3 cwt.; Sulphate of potash, 1½ cwt.; equals 10 cwt. This mixture contains—Nitrogen, 11 per cent.; Phosphoric acid, 5 per cent. (all water-soluble); Potash, 7.8 per cent. This is applied at the rate of 4lbs. to each vine. Each vine will thus receive—7ozs. nitrogen, 3¼ozs. phosphoric acid, 5ozs. potash, at a cost of under 5d. per vine.

When the fruit begins to ripen it should be picked at least twice a week. It will keep well in a cool dry place, but I would recommend marketing every week.

— Grading and Packing. —

All badly formed and inferior fruit is discarded, and the better fruit is mostly packed in layers, so that when opened at the markets it presents a good appearance. In grading, colour as well as size are taken into consideration, and badly coloured fruits are sorted out and packed separately.

The quality of the passion-fruit grown in this State is all that can be desired, but the industry does not receive the attention it deserves, and growers might, with advantage, turn their attention more to the production of this popular fruit.

In conclusion, the passion-vine provided the site and soil are suitable, is easily grown, cheaply maintained, and forms a valuable means of providing early returns until the orchard begins to bear.

There is no question that very creditable work is being done by many of the Cumberland growers, all of whom show that they have a proper grasp of their work, and that they find fruit-growing in the Cumberland district a very profitable industry. Most of them are large growers of citrus as well as passion-fruit, and they keep themselves thoroughly abreast of the times. There are many such growers throughout the same county who take a pride in their orchards, and the quality of the fruit which they are able to put upon the market, and who at the yearly balancing of accounts, find that their labour has not been in vain, but that the balance in the bank has been very materially increased.

Subsoiling with Explosives at Wentworth.

In the current issue of the Agricultural Gazette of N.S.W., under heading Subsoiling with Explosives at Wentworth, it is reported that a demonstration in subsoiling was given on 9th August last, the explosive used being Monobel powder, for which Messrs Dalgety and Co. are the agents. There is hardpan on the area, averaging from 6 to 8 inches in thickness, but extending in places to a depth of 2 feet 6 inches.

In one place, where the hardpan extends to about 2 feet, a hole was put down 12 inches, and one plug of Monobel exploded. This just blew out the earth and left a hole the size of a hole that would be dug out for planting a young tree, at the same time shattering the ground all round for about 12 inches. The next plug was put down 18 inches; this threw out very little earth, but the earth was cracked for about 2 feet 6 inches all round the hole, and left fairly loose. Another similar charge put down 2 feet, just near the bottom of the hardpan, seemed to do very good work. The whole surface for about 6 feet in diameter was seen to rise up several inches, and Mr. Burbury pushed the handle of a shovel down about 2 feet 6 inches, near the centre of the hole, without any trouble. The next charge was put down about 2 feet 6 inches, but this was getting into softer ground, and the hardpan was not broken up so well.

A double charge at 2 feet did splendid work, cracking the ground all round for about 4 feet, and on opening up with a shovel, a hole about 18 inches in diameter was found at a depth of 2 feet.

Mr. Burbury (superintendent of the Wentworth Irrigation Areas) regards these experiments as very successful. The ground was solid clay from the surface, and 3 inches down it was as hard and dry as if baked in a fire, so that it was difficult to get a hole down with a 2-inch auger. On another block, where the hardpan was only from 6 to 10 inches thick, half a plug gave splendid results.

One of the most interesting features in the round of the last year's flower shows was the admirable display of Carnations made by Mr. J. O. Lane, of Warwick Street, Walkerville, who made good his claim to be considered the leading South Australian Carnation grower. Mr. Lane was particularly strong in choice seedlings then unnamed, but of which we have heard very excellent reports. In size and substance the blooms displayed by Mr. Lane were particularly good, and indicating great constitutional strength in the plants. We are sure that buyers who place their business in Mr. Lane's hands can do so with absolute confidence, and that he will give the very best there is in our modern descendent of the old fashioned sweet scented pink of English gardens.

Influence of the Weather on Bees.

It is universally recognised that weather plays a very important part in the life and work of bees, but very little has been done to determine exactly the effects which different types of weather have upon them. An apiarist commenced therefore in 1911 to record daily observations of the weather and of the increase in weights of two hives, one of which contained a strong colony, the other a weak one. The apiary is situated about 300 ft. above sea level in a good position, and there is a good succession of honey-producing plants. The conclusions drawn from the observations recorded, are summarised as follows in the Journal of the British Board of Agriculture :—

(1) Sunshine is of the utmost importance. There were fourteen days when the sky was completely overcast, and the average for those days showed a net daily loss of 0.053 lb. in the strong colony and 0.146 lb. in the weak one, whereas average gains when at least a part of the day was quite clear were about 1¼lb. and 1lb. respectively. There were twenty-four days when the sky was intermittently overcast, and in both hives the average increase on these days was below that for the whole period.

(2) High winds cause great loss of bees, and it is suggested that when such prevail, bees should be confined to the hives unless there are sources for honey-gathering in the immediate vicinity. If they have to fly high or to travel far, the gain of honey, if any, will be more than counterbalanced by the great loss of bees.

(3) Low temperature causes extremely poor results. Classifying the maximum temperatures recorded into three groups—those below 65 deg., those above 65 deg. and below 75 deg., and those above 75 deg.—the average results for the two hives under the three classes of temperature were a gain of 0.108 lbs. and a loss of 0.068 lbs. respectively; gains of 0.728 lbs. and 0.213 lbs. respectively ; and gains of 1.182 lbs. and 0.743 lbs. respectively.

The influence of low temperature is felt in two ways—firstly, particularly in a weak colony, the bulk of the bees have to remain in the hive to keep up the temperature so as to avoid chilling the brood, and, secondly, the flowers are affected and the amount of nectar secreted is diminished.

No conclusive evidence was obtained in support of the theory that warm nights induce a flow of nectar, and the statement often made by bee-keepers, that there is rarely a flow of honey during the prevalence of an east wind, was not supported by the results obtained in 1911.

In some ways the most striking results obtained were the differences recorded between the two hives. The two queens were sisters, that in the strong hive being in her third season, and that in the weak one being in her second. It is generally agreed that a queen in her second year is at her best, and this being so, the second colony ought to have given the better results. The natural advantage was, however, in this case more than neutralised by the shortage of stores possessed by the colony at the commencement of the season. The deficiency might have been artificially made up, but for the purposes of the experiment this was not done, with the result that the effects were most marked all through the season. The strong hive altogether made a total of 76lbs. in the season, while the weaker one only gave 36¼ lbs. increase, the average daily increases thus being 0.791 lbs. and 0.447 lbs. respectively. It is emphasised that it is of the utmost importance that colonies should meet the winter with abundance of stores, so that the earliest spell of fine weather in spring may be utilised by the queen for breeding. Otherwise the first honey flow from fruit and forest trees cannot be fully utilised.

When Longfellow was well along in years, his head as white as snow, an ardent admirer asked him one day how it was that he was able to keep so vigorous and write so beautifully. Pointing to a blossoming apple tree near by, the poet replied : " That apple tree is very old, but I never saw prettier blossoms upon it than those which it now bears. The tree grows a little new wood every year. Like the apple tree, I try to grow a little new wood every year." And what Longfellow did we all ought to do. We cannot stop the flight of time ; we can not head off one event that happeneth to all ; but we can keep on " growing new wood," and in that way keep on blossoming until the end.—Exchange.

'he Victorian Conference.

)iscussing the results of the Annual ate Conference of Fruitgrowers just ncluded in Victoria the "Weekly nes" observes that the fruit-growers ve never been a very close-knitted dy, but there have been many asons for their lack of combined ort. For their failure to form themves into a strong and effective coerative organisation, as distinguish- from a purely commercial or trad- concern, they are open to blame, t not more so than many other ctions of the producers, who might ve profited by the experiences the butter farmer. The Central uitgrower's Association, however, pears to be a representative body, ich, with the whole hearted support tne growers all over the State, ght be invested with increased power good.

General dissatisfaction was expressed at the Conference with the returns from the English market, and the conditions generally under which the export trade has to be conducted. One of the delegates said that while fruit was selling at Blackpool (England) for £1 6/8 a case, the grower of the fruit was only receiving 8/- a case, or 2½d. a pound, as against 8d. a pound, for which the fruit was sold. It seems almost incredible, and yet other growers have complained before of instances just as startling. It is not a new condition of affairs that has grown on the English markets. It is, and has been for long, a common experience. What can be doae to give the producer a fair deal? The growers at the Conference were for turning to the Government for help.

The delegates resolved to ask the Government to take steps to provide for a wider distribution of fruit in England. Mr. Lang, one of the best known growers, contended that the request was too indefinite, and declared that the Association should indicate in what way the Government might help. Another delegate considered that some assistance should be rendered by the Agent-General's office. Both were right. When the present Agent-General was appointed great stress was laid on the claim that he was to be a general agent. Surely the marketing of Australian fruit in London, when the conditions are so unsatisfactory, is a matter in which some assistance might be expected from the State's London office in the way of advice. And the Association should certainly be prepared to assist the Government if it is agreeable to take action. Mr. Graham (the Minister for Agriculture) who has had practical experience as an exporter, has declared more than once that the only satisfactory proceeding is for the fruitgrowers to send a suitable man to London. Now is the time for the Association to make an effective move. It could whip up the growers, appoint a man familiar with every phase of the business, then go to the Government and ask for a State officer to act in conjunction.

Another important matter disscussed was that of refrigeration on the ships The Government storage expert, Mr. French, declares that if the dry-air process were installed on the vessels, in place of the present direct expansion syttem, peaches and other soft fruits could safely be carried to London and back again. If Mr. French is right, the fruit growers might enter upon a new era as regards the export trade. It would mean that quantities of soft fruit, such as cherries, apricots, plums and peaches could be sent abroad, and that our export trade in fruit would commence in November and extend over six months. At present the apple export commences in February and practically ceases in two months. It was stated further that on some of the ships a dry-air chamber had been constructed in preference to the other system for carrying ship's stores because the dry air system was known to be more effective. But what chance has the fruitgrowers of inducing the shipping companies to introduce the desired reform? They have none, so there again they seem to be justified in asking the assistance of the Government. In other directions the Association is doing good work, notably in the encouragement of trial shipments of pears. It must be remembered, however, that the Association must have the united support of the growers. With regard to the representations the Association is to make to the Government, the growers should get to work at once. The Government is more ikely to help those who help themselves, and the expenses of sending a man to London would be a trifling matter if all shared in the project.

Caterpillars on Grape Vine

Arsenate of Lead is the very best thing to get rid of the caterpillars of the common vine moth caterpillar. Use 2lbs. to 50 gallons of water. Arsenate of lead can be obtained as a paste, and simply needs dissolving in the water. When using, keep it well stirred, as it will otherwise settle to the bottom and give an uneven strength. If making, say, 25 gallons, mix the 1lb. of arsenate in a gallon of water and then make up to the full amount.—W. W. Froggatt.

Export of Fruit.

PROBLEMS OF CONSIGNMENT.

A CLARE FRUITGROWER'S VIEWS.

The time being close at hand when shipowners will be booking space to exporters of fruit for the coming fruit export season, some opportune comments have been made by Mr. J. H. Knappstein, of Clare to a representative of the "Advertiser." He points out that all districts of the Commonwealth in the temperate zone are eminently adapted to the cultivation of apples, pears, deciduous fruit trees, and vines. Thousands of acres have been planted, so that the increasing production gives rise to the question—How can the surplus be disposed of with advantage outside Australia? The teeming population of Europe would take and pay a fair price for these fruits delivered in good condition when "home" markets are short of home-grown supplies. There are two essential factors to a steady trade, first, how to deliver fruits in oversea markets in good condition at reasonable cost, and secondly how to market so that the consumer can buy at a reasonable rate, sufficient to leave the producer in Australia with a fair margin of profit on the cost of production.

Australia has shipped fruits home for more than 15 years, beginning with very few until last season (1912) the total quantity reached nearly one million cases. Thus it appears as if the industry shows excellent progress, but if the experiences of other growers and exporters are similar to those of Mr. Knappstein, there is much to be accomplished before the commercial stability of the trade becomes entirely satisfactory. Fruits grown for export must be shipped as soon as sufficiently ripe, to catch the short seasonable markets at home. If they are shipped later the supplies would clash with the European fruit season, and if held here the local market could not absorb them at 6d. per case. Apples and pears can be kept in storage here for months almost without any deterioration. At the present time (October) there are thousands of cases held in storage waiting their time to be put on the market. At Clare, Mr. Knappstein has 500 cases of apples put on the floor of a straw-covered shed, and they without any refrigeration, are to-day in good condition. The waste is less than 5 per cent. "But," remarked Mr. Knappstein, "the case is quite different when we ship this fruit to Europe in so-called 'refrigerated chambers.' The chance of its arrival in good condition is as much a speculation as a mining share. The reports usually run in the beginning of the season for the first month's shipment that the fruit is green, shrivelled, and not matured.' After that we are told it is overripe, but hardly ever is a shipment reported as arriving in 'excellent condition.' It seems that no progress whatever has been made in the safer carriage of fresh fruit between Australia and Europe for pears, except with one or two lines of boats. This would tend to prove that either the installation on the regular fruit carrying boats is at fault, or that the temperatures and ventilation during transit are shamefully neglected. Personally, I think the temperatures are allowed to go too high, and that the fruit is suffocated through lack of sufficient outlets for the exhalations and vitiated air. I have taken pears into the cabin of a mailboat when leaving Australia in June, kept them there, and had good sound pears to give friends at home.

"The freight charged for this class of cargo, viz., from 60/- to 75/- per ton of 40 cubic feet, prepaid, is a gold mine to the ship owners. For this remuneration they should certainly take the responsibility, and guarantee a certain and uniform temperature, with necessary ventilation during the voyage, to be proved by self-registering thermometers. This would ensure the delivery in sound condition, or otherwise the shipowners should admit and settle the claim for damage done in Australia. All fruit to be examined and passed (or rejected) for export by a Commonwealth fruit inspector. If thought advisable, the ship owners could employ their own inspectors as well to ensure good conditions at time of shipment; but if once passed as sound and fit for shipment the ship should be held responsible for damage, if any. For this risk they charge their very high freights of from 60/- upwards. Another existing grievance is the filling of the different chambers at the various ports, and I am assured that hardly ever is a chamber quite filled at either Hobart or Melbourne, but is left partly filled, and then opened again and filled right up at Adelaide or even Perth. This does not give the earlier shipped fruit a chance, as it should be properly cooled by the time the boat reaches Adelaide; nor is it beneficial to the fruit shipped in Adelaide, which is nearly always precooled, but being stowed on top of Tasmanian and Victorian fruit has all the exhalations of the lower fruit passing it. Also being placed on top of the chamber, it is exposed to the warmer and lighter air continually.

"If the exporter of fruit could be reasonably certain that his fruit will arrive in good marketable condition, he would be satisfied with a lower average price at home, but as at present conducted,

he may, and does, frequently lose a whole consignment. This loss sometimes means that it takes a whole season's export of his fruit to pay the charges and freight which amount to about 9/- per case. The most delicate and tender fruit, such as Duchess (or William) pears can be carried without any risk. In 1911 the Somerset took a whole shipment of these pears from Melbourne to London, delivering them in excellent condition, also a shipment by another boat in 1910 from Adelaide. These pears were shipped under Government supervision, and the temperatures and ventilation were carefully attended to. by their inspectors during the voyage. Contrast this with this season's fiasco by a certain vessel. The agents circularised the growers last November that they would put the vessel on the berth in February, 1912, to take Duchess pears and carry them at the necessary lower temperature. They offered to take the care required for pears if they obtained sufficient support to fill a separate chamber of about 5,000 cases. The freight for these, in view of the extra care required and lower temperature, would be 75/- per ton, whereas the freight for apples was to be 65/. I booked some 600 cases on these terms, and was advised by the local agents to have the fruit ready for shipment in Port Adelaide by a certain date. The fruit was preserved for a period of from three to eight days at the Government depot. and the condition of fruit at time of shipment was reported as good. The freight was prepaid, and nothing more was heard until a cable was published that all the pears shipped by this boat were on arrival in London found to be rotten, and the whole consignment was condemned and destroyed by the health authorities. One case of these pears, taken indiscriminately from the lot in Port Adelaide, all bearing the same mark, had been held in the Government depot as a check. It was kept in the anteroom of the cool chambers under Government control, where the temperature varied between 32 and 40 deg., and when opened fully 14 days after the shipment had arrived in London, disclosed all the pears in perfect condition. They were so sound that they were ultimately kept for four weeks longer, and then proved quite firm and fit for use. Some were taken out and left with the agents in Adelaide, with instructions to see the balance of the case at any time they liked at the Government Depot. A claim was lodged for the loss sustained. The agents passed on the claim, and reported on the facts to the shipowners, who repudiated all liability, even to the refund of the freight paid. Since then claims have been presented in London through our Trade Commissioner, but they have also been curtly declined. Subsequently it was ascertained that the vessel had only a total of a little over 800 cases of pears on board, so that my pears were taken into the chamber with the apples, although the pear rate was charged with the above result. The apples on this ship also arrived in a very indifferent condition, and I hear from several exporters that they did not realise the charges incurred. The same boat in the season 1911 delivered the whole cargo of her fruit in bad condition, mostly unsaleable, but in this instance the owners supplemented the shippers' loss by giving them up to 7/6 per case for the fruit, and where it realised from 7/6 to 10/- per case, making an extra payment of 1/-.

"Reasonably safe transport should be quarenteed the shipper. But he has no remedy for failures. He would have to proceed against the owners in London, and probably have to fight the whole Shipping Combine — a proceeding which no private individual would undertake, and which even a very wealthy firm would hesitate to tackle. This is only one instance out of many which I could give during 14 years' experience as a shipper of fruit. Unless this state of affairs is remedied, the shipping will gradually cease, and a good number of smaller growers who have staked their all on this industry will be ruined. Already in the district of Clare the growing of apples and pears for export is considered a losing proposition. Several gardens have been uprooted, and more are likely to follow.

"Two lines of steamers have been conspicuous this season for the successful carriage of fruit. How can the present uncertainty be remedied so as to give the shipper a fair deal. First, united action by the exporters of fruit is necessary to obtain an equitable control for the carriage of fruit, and admission of right to follow up the claims in Australia, and if necessary to obtain finality in an Australian court. Dissatisfaction is rampant now, but as long as the fruit is being shipped shipowners apparently are not likely to do anything to guarantee the grower against loss. Commonwealth legislation is required. There is nothing like this onesidedness in any other business I know of. The exporter ships the fruit, pays his money, and the shipowner guarantees nothing. In fact, as one of the leading fruit-handlers on the ships in Port Adelaide told me, the whole thing of safe delivery is a 'fluke.' 'It is only the hardest varieties of fruit that can stand the treatment they receive, and not suffer,' he said, 'and if you will as an experiment ship some fruit as general cargo in 'tween decks at 40/- or thereabouts per ton, the ship to go via the Cape, it will arrive as well as the majority of the fruit shipped in cool chamber." Before this month is gone we will be asked to book space for shipments four or more months hence, and fruitgrowers and shippers throughout the Commonwealth should take united action to secure better conditions."

There are things worse than war—the passions that lead to war: selfishness, ambitions—these are the supreme evils.

The Farm

Management of Shy-Feeders.

Among stabled horses there are frequently met with those which are more than usually particular and dainty in regard to their food, and which easily go off it. Such delicate or shy feeders—as they are termed in stable parlance—are generally bad doers, and it proves difficult to maintain them in satisfactory bodily condition or to get them to thrive as well as they should do. In some cases, in fact, it is found to be practically impossible to keep a shy feeder in decent condition, no matter how much trouble and care is taken.

Horses which are shy feeders and have a delicate and oftentimes 'a capricious appetite require to be fed with something extra and special attention if they are to be kept in good—or, at any rate, in passable condition. They need humouring a bit in regard to their food in order to get them to feed properly. Their appetite needs to be kept up as regularly as possible by careful management. It should be stimulated by rendering the 'food as palatable as can be. The horses' likes in the way of food should be studied. Frequently these shy feeders show a decided perference for certain foods, and will eat freely of them while disdaining others.

— Some Mixtures. —

Thus in some cases it may be found a useful plan to mix dry bran with the corn instead of the customary chaff, bran generally being greatly relished by horses. In other cases it may be found that the horse preferes crushed oats to whole ones, and it should be humoured accordingly. Again, in other instances a mixture of aats and maize—perhaps with a few beans added—may prove more to the liking of a shy feeder than oats alone. The palatability of the corn-ration may be much increased by mixing with it some minced carrots or chaffed green forage, while the addition of a couple of handfuls of linseed meal to the feed of corn also serves to render it much more palatable to the horse.

It is always important not to give too large a quantity of corn at a time. Small feeds should be given at ferquent intervals, this plan being the best and usually the only way to ensure a regular appetite and a clean manger. Only very little chaff should be mixed with the corn, or, as has already been mentioned, it oftentimes proves a very useful plan to substitute bran for the chaff. Nothing is more calculated to put a shy feeder off its food than the common practice of filling a huge feed of corn and chaff into the manger at one time. When this reprehensible mode of feeding is followed the food is blown upon and perhaps also slobbered over by the horse, thus becoming stale and being rendered unpalatable to a horse that is inclined to daintiness in feeding. Any food which the horse may have left in the manger after finishing his feed should be immediately removed, an empty manger in between the appointed feeding times being requisite if the horse is to be ready for its next feed. The manger, it need hardly be said, must be kept clean, and punctuality and regularity in feeding are of great assistance in promoting the welfare of a horse that is a bad doer owing to a delicate appetite.

— A Supply of Salt. —

A supply of salt helps to keep up the appetite and to maintain its regularity, and it should therefore never be omitted to place a lump of rock salt within reach of the animal. It is most desirable and advisable to let a horse which is a shy feeder have constant access to water by keeuing a bucket filled with water in the stall or loose box. This mode of watering is frequently of much use in getting delicate feeders to eat their food more readily than they otherwise do. In many cases it will be found that when they have the opportunity of drinking an occasional godown of water whilst eating their corn or hay, they feed with more relish and zest, the appetite being stimulated by drinking while feeding.

It is necessary to exercise care not to let the system get into a heated state, while it is also of the utmost importance to keep the bowels in perfect working order. If the latter are allowed to become at all constipated, or if the system gets into a heated state, the appetite of the horse is sure to be adversely affected thereby, and becomes even more than usually capricious and dainty. In order to keep the system cool and the bowels sufficiently active an ample supply of laxative food of some description or another must be provided, this being a most important point.

— Appetising Foods. —

When a shy feeder happens to go completely off its corn without apparent cause, the best plan to adopt is to miss out one or even two feeds of corn, giving a bran mash or a bran and linseed mash instead of the corn feed. By doing this the appetite can usually be easily restored again. It is of no use under these circumstances to try and get a horse to eat its corn by putting some in the manger and leaving it there. The animal, when really off its corn, will not touch it, and to put any before it then simply disgusts it. The only proper caurse to adopt is to restore the appetite by depriving the horse of one or two feeds of corn and thus making it thoroughly hungry.

The hay which is fed to horses that are delicate feeders should be of as good quality and as palatable as possible. Inferior and poor hay is not suitable for such horses, as they require tasty stuff. A horse never surfeits itself by eating hay, no matter how much it eats, and hay can well be supplied ad libitum, this plan being best. The horse can then pick out the tasty parts, while rejecting the unpalatable bits, and this plan, though it may appear somewhat wasteful, at any rate ensures that the horse eats a sufficiency of hay. Some horses evince a great partiality for slightly mow-burnt hay, much preferring it to lighter coloured hay which has not heated so much in the stack. Shy feeders may with advantage be humoured in respect to this.

The proper and only successful way of keeping a shy feeder in good appetite and satisfactory condition is to feed the animal carefully in the manner described above.—Kisber, in "The Live Stock Journal."

Ringing Pigs.

Some are indifferent as to this, and never ring pigs ; others ring every one systematically, and this is undoubtedly the best way. Pigs that have no rings in their noses are terrible torments. If kept in the stye they are constantly trying to upset the floor, and very often succeed in spoiling it completely. If they are at liberty in the fields they will burrow, particularly in the pastures, and make the surface in such a state that one has sometimes to look twice to see whether the field is a ploughed one or a grass one, and this is not only destructive but extremely untidy. It gives the impression that the owner does not care how things go, and that he is not of a progressive disposition. But the cheap and simple process of ringing will stop all this so far as the pigs are concerned, and all pigs ought to be rung just before weaned, or soon after. It does not affect then in the least, and they eat, drink, and are as merry immediately after as before. It is very much easier to ring them when little pigs than attempting it when they are savage sows or boars. Little bits of sniffling rings are sometimes used, but good strong ones are the best preventive against the most objectionable of their habits of turning the floors and fields upside down. Any handy-man on the farm can ring pigs as efficiently as a vet., and a great point is not to omit one.

Harvesting Lucerne.

According to some careful tests made at one of the American experimental farms to determine when to cut lucerne and how many times it should be cut during the season in order to obtain the greatest yield of nutritious produce, it was found first that the largest annual yield per acre is obtained by early cutting and the lowest by the late, the average result being—Early cutting, 100; medium, 92; late, 85. Second, the early cut contains the highest per cent. of protein and fat, the most valuable food constituents, and the lowest per cent. of crude fibre, the most indigestible portion. The former decrease constantly, while the latter increases rapidly from early bloom till the full maturity of the plant. Third, the proportionate amount of leaves to stems is greater at early bloom than at any subsequent time, and both leaves and stems contain a greater per cent. of protein and less per cent. of crude fibre at this time than at any later period in the growth of the plant. The relative portions of leaves to stems in the different cuttings are:—Early, 42 to 58; medium, 40 to 60; late 33 to 67. Fourth, lucerne leaves as compared with stems are very much richer in protein, fat and nitrogen free extract, and they contain a smaller proportion of crude fibre. The per cent. of the protein and fat grows constantly less, and that of the crude fibre greater, from the time of early bloom to maturity. The average composition of all cuttings and crops shows the leaves to contain 150 per cent. more nitrogen free exstems, 300 per cent. more fat, 35 per cent. more nitrogen free extract, and 256 per cent. less crude fibre. Fifth, the more important nutrients, protein and fat, have the highest per cent. of digestibility in the early cuttings, and it grows less and less with the age of the plant. Sixth, in the feeding tests, the highest gains were made from the early cuttings, and the lowest from the late, the results standing proportionately as:—Early cutting, 100; medium, 85; late 75. Seventh, the variation in the amount of the different cuttings eaten per day was very slight, being the highest for the early cutting and the lowest for the late, but the quantity of dry matter and also of digestible matter required for a pound of gain was decidedly lowest for the early cutting and highest for the late, the relative amounts of dry matter standing as:—Early cutting, 100; medium, 131; late, 166. Eighth, the annual fattening product per acre was the largest from the early cuttings, not only in the general average, but in each separate season's best, and that from the late cuttings was smallest, the proportional products being:—Early cutting, 100; medium, 79½; late 69½. Ninth, taking all points into consideration, both separately and collectively including everything that pertains to the largest yield and highest feeding value, the tests favor cutting lucerne for stock feeding when the first blooms appear.

Shoeing the Farm Horse.

Occasionally, a farmer is found who is as particular about having his horses properly shod all around at all seasons of the year as is the man who drives a fancy carriage pair, and it is generally noticeable that these are the men who have the best class of farm horses, and keep them looking at their best at all times. Then there are others who keep their horses shod all around, and have them reshod only when the shoes come off or become loose, paying little or no attention to the appearance, or the inconveaience and suffering which is caused the animal by overgrown toes, unprotected heels, and sagging soles if the horse be of the flatfooted type. These men may be said to abuse their horses as badly as possible in the matter of shoeing, and their general appearance would often indicate that this is not the only abuse which they suffer. The some men can be found who think money paid for horse-shoeing when it can possibly be avoided is wasted, and allow their horses to cripple around with broken hoofs and tender soles when doing all kinds of work. While these horses probably suffer less permanent injury than the last described, they suffer great discomfort, and their appearance and usefulness is often impaired and their gait and disposition harmed by this treatment. Then there is another class of farmers who take into consideration the kind of work the horse is doing, the kind of feet with which he is blessed, and use a wise economy in the matter of horse-shoeing bills compatible with a minimum of discomfort to their horses or inconvenience to themselves.

Of course, there is a great difference in horses' feet, and a great difference in the kind of work wh ch they are called upon to perform, and while a man can be extravagant in the matter of horse-shoeing as in any other department of business, yet it would be a grand thing if more farmers realised that the matter of horse-shoeing is worthy of more than passing attention, and that proper attention aloog this line would result in economy in feed bills, and in his capital stock so far as the inventory value of his horse is concerned.

Jerking the Reins.

A French expert, Baron Henry d' Anchald, has published the result of his observations on the painful effects of the practice of jerking the reins. We are apt to forget, he writes, that this mouth, which serves as the medium of communication between us and the animal, should never be subjected to rough treatment or shock if it is to remain sensitive and beautiful, as it undoubtedly is; that this mouth becomes bewildered and uncertain, so to speak, and hard under stupid or violent treatment, the jerking of the reins rendering the animal indocile, sullen, and stubborn. To appreciate more nearly the intensity of the pain caused by the jerking of the reins, it needs only to be remembered that the connon of the bit, which is more or less thick and round, rests upon but a very small part of a membrane which is delicate, very nervous, and is itself the envelope of a tolerably trenchant bone. If one can imagine, therefore, the effect of a 33 lb. weight (so M. d'Anchald calculates the pressure) falling on one's toes from a height of, say, 15 to 20 inches, one realises to some extent the pain which is inflicted on an unfortunate horse by this always brutal jerking of the reins. Not only is jerking the reins useless in itself, but it is also most harmful, especially to young horses, as it compromises their future in that, the pain caused by it involves a loss of energy and fatigue, which soon uses up the animal. A flick of the whip applied to the hindquarters or the withers, for example, should be all that is needed to stimulate the horse to fresh exertion.

When dung has to be kept for some time it should be stored in a pit with a watertight bottom to prevent loss by drainage of the valuable liquid.

How to Build Up a Dairy Herd.

An instructive paper read before a conference of dairymen at Palmerston, N.Z. :—

The great problem that faces the dairyman to-day is this :—

"Is it possible to reduce the cost of manufacture and marketing, so as to obtain better net results for the producer ; or can we decrease the cost of production by producing more at present cost ?" Along one of these two paths we have to travel. In reference to the former, saving in some directions may be effected, but it will not, when all is accomplished, even if brought down to a minimum, amount to much per head per cow. On the other hand, the latter may, by attention, skill, and judicious management, be added to by at least 33 one-third per cent. This may appear at first blush a large order, but it can be brought about, and would establish the industry on a permanent and satisfactory basis. Not only would it add to individual returns, but any such approximate increase would legitimately reduce the manufacturing cost of a pound of commercial butter at least 20 to 25 per cent. It can only be accomplished by the dairyman applying to his work those principles which make for success in every department or profession of life.

— Possibility of Improvement. —

If we strike a fair average, it is below the mark to say that cows in the colony are producing only 180lbs. of butter fat per season ? Now, if this is calculated at present-day price, 10d. per lb., it gives the result of £7 10/- per cow for the season's milk. Is that considered by you practical dairyman a satisfactory condition ? Are you content to remain there ? There is no profit in 180lb. cows. You would not keep a workman in your employ who was only paying for his board. Yet many to-day are keeping cows of which we may safely say one-fourth actually are not doing this, but bringing you into debt. There is no excuse for such wanton waste at this time of the industry. Suppose the average could be raised by a third, we get 240lb. as the yield, which at the above price would give £10 per head. Now, if this assumption be correct, and few dairymen will have the hardihood to deny or question it, the position is this : Should dairy produce fall in value one-third, by a corresponding improvement in our herds to a higher standard we should still be in the same place financially—able to pay our way, and meet all engagements in connection with the farm, just as if we were favoured as we are to-day with high prices. Surely, the thoughtful man will admit that, while we may possess many cows that are good, the proportion of ones that are useless, not actually paying for the labour expended on them and the food they eat, is far too great. The object of this paper is to indicate how this serious defect may be remedied.

— Education. —

It is frequently asked, "Does dairying pay ?" "Will it pay to make it my business in life ?" Yes, if you have brains and know how to use them intelligently. Physical strength and muscle are not the only capital which spells success in business. It is just here where the value of agricultural knowledge comes in. We are face to face with the necessity of imparting knowledge on agricultural matters to our children. The majority of such who attend country schools live in an environment of agriculture. If they were given some acquaintance and knowledge of those elementary principles which form the foundation of natural results they come in contact with day by day, more good would ensue than from a close adherence to the present school curriculum. It is not possible to teach all the elements of practical agriculture, but many things may be taught beneficially and with advantage. It is an accepted axiom of life that few men succeed in any calling unless their heart is in the work and they love it. Unfortunately, many of our dairymen are in the business to-day, not because they like it, but because it is a means to an end. Hence we find failure where there should be victory. Did they but understand the fundamental principles upon which their work rests and the wonderful opportunities that surround them only waiting to be appropriated, there would be no need to urge the course now proposed to improve their herds. For every farmer worthy of the name would seek to have the best crops, the best herds, the tidiest farm, and the best quality of milk procurable.

— Causes of Unprofitableness. —

Now, consider briefly the reasons which have brought about existing conditions, and that so large a percentage of our dairy cows are unprofitable. Firstly, it is due in a measure to the fact that dairying has increased so rapidly within the last few years that farmers, to complete their herds up to the maximum carrying capacity of their farms, have had to bring under contribution every heifer that would come into profit. Se-

lection and culling have, therefore, through force of circumstances, been neglected or left severely alone. Secondly, a large percentage of cows used for dairying purposes are not adapted for the fulfilment of the conditions for which they are kept, in consequence of the use of sires that are "mongrels" or not capable of producing milkers. Thirdly, many never have the opportunity, through want of proper treatment, such as the care and education of the heifer—which will be referred to later on—and being underfed and neglected, fail to develop their best milking qualities and prove their usefulness. Every one of these disabilities is removable, and should be rectified without delay.

— Dual Purpose Cow. —

It is impossible for a cow to be a first class beef animal and the highest type of and most profitable dairy cow. The requisite functions, widely different, continually war against each other. For every year's keep of a cow, and for every hour of labour spent thereon, you want the maximum amount of profit derivable from the animal's life purpose. It is a true saying "that no man can serve two masters." If you want the milk pail to pay its utmost, go for the animal that will put the best quality and the greatest quantity into it, irrespective of any other consideration. If you want beef, go for the elements that produce it in the quickest time, at least cost, and finest quality. Take a typical first-class dairy cow; such a one, if well treated and well fed, will return you at least for ten years, £10 per annum for milk alone, and probably ten calves during the same period. Of this progeny five may be heifers, and, if properly cared for, will be worth more than the same class of cattle from a "dual purpose cow. The remainder being bull calves, and perhaps their pedigrees not clean and so unprofitable to keep, kill them, and raise pork instead. The sooner dairymen get rid of the notion that a "dual purpose" cow is the proper ideal, the better, and turn their attention to the production of a special purpose cow that will give from year to year such results as have not yet been attained in this colony. There is one question in connection with this matter that is submitted to you for your earnest and thoughtful consideration. Which pays the best, beef raising or dairying? No doubt the latter. Then has it never occurred to you that with a "dual purpose" cow that you think so much of, you are in an incidental way allowing the element of beef and its production to creep into your milking herds, and you are, therefore, forced to compete with the beef-producing interests, which work at a less cost and do not give the same result. In view of the high price now ruling for dairying land, can you afford to do this? There is no desire to disparage the grazier or his work. Let him follow his own path, but the dairyman should not attempt to walk both roads.

— Feeding and Shelter. —

It is not only necessary to have a carefully selected herd to obtain the best results, but full provision must be made for their maintenance when you possess them. In considering this aspect of the question, the acknowledged text books on feeding are to us valueless; because in most dairying countries the winters are long and severe, so that it becomes absolutely necessary to house and feed the cows. Here the seasons, on the whole, are comparatively mild, and stock do not require the close attention given elsewhere. However, there are one or two points that must not be overlooked. Remember, the cow is a machine to manufacture green and succulent forms of fodder into milk. The machine requires a certain amount to keep it in perfect working order; the amount consumed and so converted over and above what is required for her own support, is your profit. The universal practice in the colony is to allow the herd to roam at large on the permanent pastures of the farm. When cattle thus gather their own food from the soil on which it grows, instead of having it carried to them, they themselves do the bulk of the labour which is necessary to their existence throughout the year. We should, therefore, see that the supply of nourishment is ample during the period of lactation, and above all things guard against overstocking. In every pasture there is so much potential milk in a specified year, and if 20 cows can take it out, 25 will get no more. Indeed, there is a possibility they will get less, for the simple reason that you have to support five additional carcases. Better provision should be made for winter and early spring feeding. It pays to winter dairy stock well. How can it be expected that cows beginning a winter season in low condition, carrying a calf from five to six months old, which has to be nourished and matured until dropped, can do well in early spring? It takes frequently two months of the latter period of the year before they recover normal conditions. With a plentiful supply of well-made hay, ensilage and roots, and the cows rugged, they should be at their best in the early spring to begin their work of production. There is also one question in this connection that deserves consideration, and would not be costly to

adopt. The best dairying districts of New Zealand, and especially is this true of the North Island, were once dense bush. This has been destroyed. Nothing in the way of shelter of a similar kind has been provided to any extent. The rapid changes that frequently take place in our winter, such as the transition from a bright sunny day to a cold driving wind at night, are keenly felt by the dairy cow. The bitterness of the night drifts could be much tempered by the shelter of suitable plantations, instead of always relying on the protection of a six or eight barbed wire to keep a cow comfortable.

— Breeding and the Influence of the Male. —

One reason assigned for the many unprofitable cows is that "their sires were mongrels or not adapted to producing milkers." In a good dairy the bull is the important factor. This, for some reason that is unaccountable, is too frequently ignored. Again and again it has been the experience of the writer to see purchases made at public sales of a sire for the coming season at 17/6 to 30/. We are milking to-day the progeny of bulls that cost 17/6 to 30/. Just think of it. Is it any wonder that we have to deplore, at the end of a season, the small results received from each cow? The breeding of a good animal should be a delight to a lover of stock. The drudgery of dairy farming can be rendered in a measure enjoyable if we pay more attention to this interesting department of our work. To some men it comes as an intuition the skill and judgment exercised in mating animals to produce a certain type, combined, of course, witn thought and experience. Others, again, work it out for themselves without possessing any natural gift or talent in that direction. There are others, however, who never acquire it, for they never try. In the near future the object aimed at by all interested in the industry must be the breeding of their own stock, and the application to this special department of work in that line of breeding that will improve the milk yield. It is generally admitted that the "bull is half the herd." In practice this is not true. He stands in relation to the whole in a greater ratio than one-half. Therefore, it is of the utmost importance that only good specimens should be allowed to propagate their species. The bull should be pure bred; because of a long line of clean ancestry his breed characteristics are permanently fixed, and these may be relied on to be reproduced in his progeny. On the other hand, a "cross-bred" sire (by this is meant the offspring of a pure sire and an ordinary-bred dam, or vice-versa), though in appearance and looks superior in some respects to the purebred, has been bred in a "happy-go-lucky" style far too common, and lacks the power of "prepotency" and "heredity." Such a bull is probably one of the accidents of Nature, and if used will throw nothing equal to himself, but invariably reproduce the defects and shortcomings of his ancestors. It is a sine qua non that the animal at the head of your herd should be pure-bred, not too masculine in appearance, but sufficiently marked to indicate from his appearance that he possesses a strong individual character. He must be of a determined dairy type, full of nervous energy, so that he will take possession of the female current with which he is brought in contact and impress upon his heifers the quality of the dams that are behind him; well-formed and well-grown, of good colour and constitution, vigorous, with a capacity to transmit to his offspring the peculiar good properties, excellences and form which he has inherited from a succession of ancestors endowed with similar characteristics. See that he comes from a milking strain, especially on the dam's side—it is advisable to have this quality well authenticated. An able writer on this subject has said:—"The most reliable basis of calculation as to the power of transmission, or, as it is called, the "prepotency" of the bull, is the dairy character of his grandmothers and great grandmothers on both sides of his pedigree. He is the stored-up result of what lies behind him. The quality of his ancestors will have more effect on his offspring than the performance of his mother."

Further, take care that those parts of the body where the male follows the female anatomy are well developed, if you want heifers with shapely udders and well-formed teats. Failures are inevitable. The percentage, however, of victories on the lines indicated are abundant proof of their soundness and value, and if any material improvement is to be generally brought about, one of the first steps must be in the direction of using purebred sires only.

— Testing. —

If asked what is the fundamental principle to bring about immediate improvement, the answer would be "complete knowledge of each individual cow in the herd." This information can only be gained by a thorough test for quality, quantity and length of time in milk. With the aid of the Babcock test and a pair of scales, there is no excuse why you should not know the actual worth of every cow you own. At present you are absolutely working in the dark. Not only do you not know what each cow is worth, but without this knowledge you cannot go in for intelligent breeding. Having ascertained the capabilities as a butter producer of each cow in your herd then you are in a position to do successful and good work in breeding, and you cannot do your best work till you have this information. Knowing with certainty that you have some cows that will show a good butter record

and a bull from a choice butter-making family, then you can rear some heifers that will be a credit to you. Testing will not only disclose the good, it will also unmask the bad. That is what we want. Cull the "duffers" and pass them out in double-quick time or turn them into beef without delay. The testing should be well done. It will, of course, as already pointed out, take time a little labour and some additional expense. Suppose it costs £6 for a year and you get back £25 or £30, surely that is a good investment. Calculating on a basis of a dairy of 30 cows, and taking two tests per month from each for eight months, at threepence per test, would be £6, with the addition of your time and labour. Is that too big a premium to pay so that you may have every £100 now received from the factory increased to £130? Probably your co-operative factories, to encourage such good work, would do it for less. A sufficiently reliable test can be obtained by taking a test twice a month, equal quantities being taken for a week from the morning's and evening's milk for, say, a period of eight months, or during such time as the cow is in milk. A daily record of the milk weight must be kept, and with the help of the fortnightly test the results will be accurately known. The average dairyman dreads to undertake this work, because of its apparent vastness. Notwithing this fact, it is asserted with confidence that without the application of this test there is but a poor prospect ahead of such an one. Sooner or later we shall awake to the fact that despite our natural advantages, some other country has "whipped" us at our own game. The cost of manufacture cannot well be decreased, but there can be a mighty increase of production at the same cost, and in this direction lie our safety and salvation.

— Education of the Cow. —

In conclusion let me refer to another reason assigned for unprofitable cows: "Many never have the opportunity, through want of proper treatment to develop their best milking abilities." To make a first-class dairy cow, let the heifer calve in the autumn, milk through the winter, giving plenty of nutritious food, then, when the early grass becomes plentiful, she comes back to full profit, and will milk on to the end of the season, a period of twelve or fourteen months. By following this plan during the first milking period, you educate the future cow to her business in life, and establish or fix the habit of milking as long as you like. If they are allowed to go dry too early in the first year of milking they will do it the second year, and so form the habit. We want a class of cow that will not only give a good record of herself in December, but will do so for five months afterwards, and if the plan suggested is followed it will develop the milking habit, and render it practicable to secure in a season that large yield of butter-fat which alone should give satisfaction. By lengthening the period of lactation it will be found a great help in realising the object in view. The writer has not sought to advocate the claims of any particular breed of cattle, because that was not the intention of the paper, but to lay down general principles which ought to be followed if your efforts are to attain that position of excellence which alone merits success. Given a dairyman with ordinary intelligence, taking a herd of average cows, and following the principle of closely breeding from a pure-bred sire, from some recognised dairying strain, together with constant testing, it is guaranteed that at the end of five or six years he will have built up a dairy herd that will give a good account of itself and be a source of satisfaction to the owner.

Growth of the Horse's Hoof.

All parts of the hoof grow forward and downward with equal rapidity, the rate of growth being entirely dependent upon the amount of blood in the pododerm or "quick." Abundant and regular exercise, good grooming, moistness and suppleness of the hoof, going bare foot, plenty of good food, and at proper intervals removing the overgrowth of hoof and regulating the bearing surface, by increasing the volume and improving the quality of blood flowing into the pododern, favour the rapid growth of horn of good quality; while lack of exercise, dryness of horn and excessive length of the hoof hinder growth. The average rate of growth is about one-third of an inch a mouth. Hind hoofs grow faster than fore hoofs, and unshod ones faster than shod ones. The times required for the horn to grow from the coronet to the ground, though influenced to a slight degree by the recited conditions, varies in proportion to the distance of the coronet from the ground. At the toe, depending on its height, the horn grows down in 11 to 13 months, at the side wall in six to eight months, and at the heels in three to five months. We can thus estimate with tolerable accuracy the time required for the disappearance of such defects in the hoof as cracks, clefts, etc.

Breeding Dairy Cattle.

One thing ought always to be considered when men start out to buy pure bred cattle. That is, that the knowledge, skill and character of the breeder is about as important as is the animal they are to buy. There is a wonderful difference between being a real breeder and one who simply mates male and female. The art and philosophy of breeding is a very deep question. One man's cattle show almost always a progressive quality. They are the product of skilful, intelligent mating. Another man gives no thought to the deeper phases of the question. He simply breeds pure bred cattle together; there is no intelligent adaptation of means to ends. The average capacity of his cattle shows a hit and miss result, that is very confusing and disappointing. It is right to say that there will be fully enough failures even with the most thoughtful and comprehensive breeders. What must it be when men who bestow but little thought or study upon the deeper physiological problems that are involved and which will have their way. Take for instance, this matter of keeping two or more bulls in a breeding herd. The question of a successful "nick" is an all important one. Yet in almost every herd of cows there will be found a certain number which do not nick well with the head of the herd. An observant breeder will note this. Mate them with another sire and with the most of them at least the result will show a decided improvement in the strength and vigour of the offspring.—Hoard's "Dairyman."

The Influence of Sex in Breeding.

There are few experienced cattle breeders who have not found that some influence has been exerted in the production of calves by either sire or dam, either from the point of view of age or blood, writes Professor Long. Many attempts have been made to ascertain how, if any means exist at all, to produce bull or heifer calves at will, and many figures have been produced showing the variation in the periods of gestation which follow when certain animals are used for stock purposes. One of the most curious statements which I remember to have seen in relation to this subject appeared in the Live Stock Journal, the writer describing the whole thing as a conundrum. He supplied carefully prepared tables from a given number of cows, the number of calves obtained, and the average periods of gestation when a particular bull was used and when other bulls were employed. For example, 20 calves which were sired by a particular bull averaged 274 days, or slightly more than nine months of 30 days each, while 22 calves sired by various bulls averaged 283 days; thus showing the influence exerted by one particular animal, or at least suggesting that there must have been such influence.

I take, however, a more complete list of instances, first remarking that certain cows in the herd habitually calved late, while others calved early, no matter what the sex; but when mated to a particular bull they calved several days before their average time, and were as a rule earlier when the calf was a heifer than when it was a bull. Forty-four calves averaged 279 days; of these 24 were bull calves, which averaged 281 days, while 20 were heifers, which averaged 277 days. Of the bull calves, nine were sired by the one animal referred to already, and their average period of gestation was 276 days. Eleven of the heifer calves sired by the same bulls averaged 272 days. On the other hand, 15 bull calves by other sires averaged 284 days, and the nine heifer calves 283.

Now we come to the longest and shortest periods, first taking the individual bull which forms the basis of the discussion. His bull calves, going the longest period before birth, went 283 days, while the shortest period for a bull calf was 266 days. The bull calf going the longest time by any other sire went 291 days, the shortest time being 279 days. Here, then, we get very divergent figures, although when we come to the heifer calves the difference is not so wide. The heifer calf by the special bull which went the longest period reached 279 days, while the calf going the shortest period reached 264 days. On the other hand, the heifers sired by other bulls went 288 days and 275 days respectively.

When these figures are studied carefully by those who have had experience in breeding, they suggest that the period of gestation is influenced, if, indeed, it is not controlled, by the individuality of one of the animals employed, as in this case by the bull whose results are compared with the results obtained from the bulls grouped together. It has often been supposed on the basis of very clear data that where a cow goes longer than the average time the calf is certain to be a bull calf, and breeders are often concerned in consequence where the average time is exceeded. As we have seen in the above instance, this view is to some extent justified. I have referred to this subject believing that these facts may supply another page of information to those who are concerned with the science and practice of cattle breeding.

The Tamworth Pig.

(By H. W. Potts, in the Agricultural Gazette of N.S.W.)

The history of the wild hog, in which its habits, strength, courage, and hardiness are discussed, is a subject of impressive interest to the pig breeder of to-day, seeing that its constitution, vigour, fecundity, quality of meat and other characteristics are faithfully transmitted. Mr. D. Lowe, in his "Domesticated Animals of the British Islands," states :—

"The facts of the animal's natural and physiological condition show the vast change which domestication produces on his character, and not more remarkable is the difference in the conditions of liberty and subjection in case of this animal than the readiness with which he, yields up his natural instincts and resigns himself to bondage. If the wild pigs be taken young from their mother in the forest they become nearly as docile as the domesticated races, and in a single generation all the fierceness which distinguished the parents is lost. Their very form becomes changed, and those characters which fit them for a state of liberty disappear as if in obedience to some natural law."

Amongst the modern breeds of pigs, none exhibit such distinct evidences of their wild origin as the Tamworth. It takes its name from the ancient town of Tamworth, on the borders of Staffordshire and Warwickshire (England), in the neighbourhood of which this undoubtedly indigenous breed of pig has been preserved from the time that the surrounding forest lands were enclosed and occupied. The breed is held to be the direct descendant of the wild hog of the Midland counties—an ancient and pure race, distinct from any other known breed.

In arriving at this conclusion, it has to be remembered that when first reclaimed from its wild state, and even within the memory of living man, after domestication, this pig exhibited thriftless and unattractive features. Ungainly in appearance, long in the leg and snout, flat and light in the rib, coarse in hair and skin, and late in maturing — these were natural characteristics which failed to appeal to the pig breeder. But it was noted that it possessed a keen sense of huger': quick senses of smell and sight; that it was hardy, vigorous and muscular; the depth through the heart pointed to a strong and healthy constitution, and power to resist disease; the sows were prolific; and both sexes provided a relishable, lean class of flesh, suitable for bacon.

The demand for lean bacon has steadily increased of late years, and the studmaster has not failed to realise in the Tamworth a keen rival to the Large Yorkshire for bacon production. A delicately flavoured bacon, with an attractive intermixture of fat, and with a preponderance of lean, is now sought for by butchers. The breeder satisfies the demand with the Tamworth, by crossing him with other smaller and more compact breeds.

As far back as 1847, Tamworths were exhibited at Agricultural Societies' Shows in England, including the Royal. For a time they dropped out of favour. About 1877, the public taste began to demand lean bacon; and the breeders, with keen judgement, careful selection, and intelligent management, steadily improved the Tamworth to supply that demand. In 1897, the Royal Agricultural Society of England set apart separate classes for them at the annual shows; and at Smithfield. The National Pig-Breeders. Association admitted the breed into their stud-book and formulated a scale of points.

As a result, substantial improvement has been noted year by year; so much so, that it is difficult to reconcile the type as bred twenty years ago with that which finds such complete favour with the bacon curers to-day. There is a vast change for the better in the skin and hair; much of the coarseness so noted in the past has disappeared; the coat is golden-

inted red; the skin devoid of back pots and fine in texture; the snout s not so lengthy nor bony, and the egs are shorter; the bone is much iner and the offal less.

The shortening of the nose has not nterfered with the animal's acute ense of smell, by which it is enabled o forage so well under adverse conlitions. The side is deeper, and the body more compact. There is greater width across the loins, and the hams are well fleshed and thickened down o the hocks.

The flesh is whiter and more deicate and relishable. The aptitude to ay on flesh has increased, and they nature more quickly.

The Tamworth were introduced to Australia by Mr. Geo. Chirnside, of Werribee, Victoria, and the Department of Agriculture of New South Wales at the Hawkesbury Agricultural College. From the latter stud piggery over 200 pedigreed boars and sows have been distributed during the past ten years. The demand for this class of pig is steadily increasing, and this points to their success as a bacon pig.

In the matter of acclimatisation, let it be understood that the term embraces the animal's power to accommodate itself to any change in external conditions of life, whether favourable or unfavourable, gradual or sudden. The Tamworth has been sufficiently long in Australia to prove that our conditions are most congenial to the breed. In fact, it may be safely asserted that it has shown marked evidence of improvement.

When we consider that some of the finest breeds of the world, which have been used to improve European wild races, were taken from the warmer countries of the East, it is not surprising to note the change for the better in breeds brought to Australia.

Here, in the midst of great open spaces, the Tamworth has the opportunity of developing its indigenous predatory instincts. They always were successful foragers, and in this regard they fully maintain their reputation. They thrive under rough grazing and out-door phases of colonial life. Owing to the possession of an easy, active carriage, muscular development, and hardy nature, they are more suited to travel distances to market than the fatter composite breeds, and avoid losing condition. It is also noted that whilst their natural instincts favour grazing and life in the open, they respond well and profitably to forced feeding in sties.

The Tamworth more nearly approaches the Large White Yorkshire, in so far that it is not a general purpose pig; and whilst it is coarser in offal, and matures more slowly, a compensating feature is the higher quality of flesh for a refined and tasty class of bacon. Those who are responsible assert that there is less waste in cooking, and that fat of the Tamworth has a choice and delicate flavour especially commended by connoisseurs.

The boar is always tractable, intelligent, and easily controlled. ...

The Tamworth sow is amongst the most easily managed and handled of all pigs at the time of farrowing. There are no difficulties to meet during parturition, a minimum of constitutional disturbances and no ill after-effects, such as milk fever. The litters range in number from 8 to 14, and will average 10. She is an ideal mother, rarely if ever overlies her young, and is always solicitous, careful and tender in looking after her progeny, and most resolute in their defence. The supply of milk is ample. Naturally it is often a matter of individuality, but our experience goes to prove that as a breed the Tamworths are good, reliable sucklers. They have a powerful digestion, are always ready for food, and have a marked aptitude for milk-production. The young pigs exhibit a strong tendency to grow, and are thrifty, lively, and always hungry. Tamworths will not tolerate a check in growth. Unlike pigs that store fat they have no reserves, and herein it must be observed that continuous increase in weight must be maintained by a permanent food supply.

In our warm, sunny climate, white pigs are liable in the summer months to be affected or scalded by long exposure to sunlight. The Tamworth does not suffer from this disaddantage, and hence he is becoming more sought after in the production of bacon, particularly when crossed with other breeds.

The most satisfactory results have been secured all over Australia from Berkshire sows. The resulting progeny mature quickly, and grow into an ideal bacon pig of about 130lb. to 150lb. live weight in six months. A similar result may be confidently expected from the Poland China and Middle York crosses.

It is becoming recognised that bacon pigs are quite as profitable as porkers, and in fact their value may be fairly estimated as on the increase. It is no stretch of the imagination to predict a successful export trade in bacon pigs to Europe at no distant date.

SCALE OF POINTS FOR TAMWORTH PIGS.

Colour.—Golden red hair on a flesh coloured skin, free from black, 5.

Head.—Fairly long, snout moderately long and quite straight, face slightly dished, wide between the ears, 4.

Ears.—Rather wide, with fine fringe, carried rigid, but inclined slightly forward, 3.

Jowl.—Small and light, 2.

Neck.—Fairly long and muscular, especially in boar, 3.

Chest.—Wide and deep, 5.

Shoulders.—Fine, slanting, and well set, 4.

Girth.—Around the heart, 4.

Sides.—Long and deep, 8.

Ribs.—Well sprung and extending well up to flank, 6.

Loin.—Wide and strong, 4.

Belly.—Full and thick, with straight underline, and at least 12 teats, 3.

Flank.—Full and well down, 4.

Quarters.—Long, wide and straight from hip to tail, 7.

Hams. — Broad, full, and well let down to hocks, 8.

Tail.—Set on high, and well tasselled, not coarse, 3.

Legs. — Strong, straight, shapely, with flinty flat bone, set well outside body, 6.

Ankles.—Strong and compact, 4.

Pasterns.—Short, and yet springy,

Feet.—Firm and strong, not splayed, 3.

Skin. — Smooth, pliant, and free from wrinkles, 2.

Hair. — Abundant, long, straight, and silky, 3.

Action.—Free and clean, 3.

Symmetry. — General style, indicating breeding and good constitution, 4.

Total number of points, 100.

OBJECTIONS.

Head.—Narrow forehead or upturned nose.

Ears.—Thick and coarse, or inclined forward.

Jowl.—Thick and coarse.

Shoulders.—Coarse, heavy, or wide and open at the top.

Ribs.—Flat or short curved; light back ribs.

Loin.—Narrow or weak.

Belly.—Flaccid, or wanting in muscle, gutty or podgy.

The Handling of Cream and Care of Butter.

— Keeping Cream Sweet. —

When cream is separated by a hand separator it is warm, and should be cooled immediately to a temperatore of 58 deg. or less and kept there, until there is enough cream to churn. The cream from cold, deep setting should also be kept cold until enough has accumulated to make a churning. The quality of butter depemds a great deal on keeping the cream cold and sweet. The cream can all be kept in one vessel provided the warm cream is cooled before mixing it with the cold cream.

— Ripening Cream. —

This means mixing all the cream together at least 12 hours before churning, and souring it. Cream should be soured at a temperature of 65deg. to 70deg. F. Every buttermaker should have a correct dairy thermometer, for one cannot do accurate work without it. It is necessary to know the temperature of the dairy room, the water, the cream when ripening and the temperature of the cream at the time of churning. No one can guess every time the correct temperature; therefore, it is important to have a thermometer to do good dairy work.

— Churning the Cream. —

After the cream is ripened it is ready to churn. The first step is to cool the cream from 65deg. F., the temperature at which the cream was ripened, to about 55deg. F. in the summer, and to 58deg. F. in the winter. If at these temperatures the cream should come in ten minutes, and the butter is soft, the next churning should be cooled somewhat lower say two degrees; on the other hand, if the cream is slow in coming, the temperature should be raised. It should not take over 20 to 30 minutes to churn a batch of butter. The time that it takes to churn depends upon five things: (1) The ripeness of the cream; (2) the temperature of the cream; (3) the thickness of the cream or the per cent. of the butter fat in it; (4) the length of time the cows have been milking; (5) the kind of feed that the cows are being fed.

When the cream begins to break, considerable care should be exercised not to gather the butter granules into one large lump. Churning should cease when the butter particles are about the size of wheat kernels.

— Salting the Butter. —

When butter is well drained it is ready to salt, and this is done in the churn, when butter is in granular form. A part of the salt is sprinkled on top of the small granules, and then the churn is turned enough to have the butter fall unsalted side up, and the rest of the salt be sifted on. Then put the cover on the churn and revolve it several times; after a few minutes the butter is taken out and worked. This method has its difficulties, for the exact amount of butter is not known, but can be closely estimated. About 1½oz of salt is used for every one pound of butter; this will ensure about the right amount of salt when the butter is finished. The butter should always be salted with good, fine dairy salt, and coarse, common barrel salt should never be used.

— Working the Butter. —

The butter should stand a few minutes, so the salt will have a chance to dissolve, then it is taken out and put on the butter worker. The object of working butter is to press the granules together, to get the salt evenly distributed, and to expel a portion of the brine. It is a very easy matter to work butter too much, and have the butter greasy. Butter should never be worked with the hands, for the warm hands will make it have a greasy and salty appearance. When the salt is evenly worked through the butter, and it has an even colour, and the granules well pressed together, it is time to quit working it.

With the lever worker, the butter is worked by pressing the lever on the surface of it, and occasionally folding the butter over with a laddle. Never allow the lever of the butter worker or butter paddle to slide over the surface of the butter, but press straight down when working.

Hemorrhage after Calving.

In dealing with retention of the placenta, reference must be made to haemorrhage or flooding. This somtimes occurs before parturition from sudden and violent movements or the foetus, tearing the umbilical cord or wrenching one or more of the "roses," by which the foetal envelopes are attached in cows and ewes. It often results in the death of the foetus and abortion. Very little can be done in the way of treatment beyond giving a calmative dose of laudanum with an astringent, such as sugar of lead or gallic acid, and placing the patient under conditions of quiet and of comfort. When haemorrhage follows on parturition, we have quite a different state of affairs to deal with, and though alarming and frequently fatal when left alone, it may usually be arrested by proper treatment.

Of the symptoms it is scarcely necessary to speak, as the gush of blood, its volume and persistence, tell only too well what has happened. It is rarely caused by any other means than the injudicious and forcible removal of the placenta.

The natural course of treatment is to stop the bleeding, and sustain the vital powers. If the foetal membranes have not been removed, they must be secured and got away, else the womb will not contract as it should. This must be done gently, as it increases for the moment the flow of blood, but must be done for the reason given above. The presence of the hand and arm, especially if the hand is opened and shut rhythmically, promotes the contraction so much desired.

This trouble is very much more frequent in the practice of the human obstetrican, and much success has attended the alternate irrigation of the uterus with hot and cold water. In veterinary work we too often have to employ "the next best thing," and large quantities of hot water are not instantly available. We then throw cold water over the loins, dash it in the face, and if a disinfectant is handy sprinkle it inside, or dip a sponge or clean cloth in it, and introduce it with the hand. Vinegar and water, in the proportion of one to two, is both a

ngent (haemostatic) and antisep-
, and this at least will be found in
e farmhouse, if nothing else. The
actice of using so-called revulsants
ly be resorted to, and mustard or
imulating liniments, applied to dis-
nt parts of the body, as the neck
chest, or even the limbs. Trembl-
g, staggering, sighing, or other signs
syncope, may be combated by
coholic stimulants, while the ex-
emities (ears and legs) are chafed
try and maintain surface circula-
on. The animal treated should be
gged up and legs bandaged; if with
warmer material, with hay-bands.
accident happens at a convenient
ne, and thus one habitually finds
wkeepers unprepared. If, then the
oung farmer will bear these main
inciples in mind, he may save him-
f the loss of a valuable cow, mare,
other animal. If a veterinary
rgeon is available, by all means get
m, but the adoption of the forego-
measures will decide the fate of
e patient before he can reach the
se. If professional assistance is not
tained, it will be necessary a couple
days later to wash out the genital
nal with some simple antiseptic, as
rbolic, very dilute, or boracic acid.
t at least twenty-four hours should
allowed to elapse before any inter-
rence is contemplated, for fear of
arting the haemorrhage again.
ere will inevitably be clots left, and
ese must not be allowed to remain
d decompose, and perhaps poison
e patient. Whenever loss of blood
curs, from whatever cause, there will
need of additional water to fill up
e blood-vessels, and the bucket
ould be frequently offered. There is
special liability to a recurrence of
e accident at any future parturi-
on, and a good beast should not be
ndemned on that account.

Filling the Silo.

As filling goes on, it is particularly
nportant to see that the chaff is
mly trodden down round the sides
he sides should be kept low, with a
nical heap of chaff in the centre.
his keeps the weight in the centre,
d there is then something firm to
sist the pressure of the treading
own as this goes on round the sides.
ne can't insist too strongly on this
oint. It requires to be done by the
wner of the silo, as the success of
xt season's fodder depends chiefly
the thoroughness with which
is done. It ought not to be left to
workman unless he realises that he
the most important man in the
hole gang. The fact that our cereals
ave a hollow stem which is full of
r makes it more difficult to turn
t a first-class sample of silage than
the case with solid stem crops, such
maize and amber cane. Our whole
iect is to exclude the air. If this
n be done perfectly the silage will
me out nearly in the same state as
crop went in. The nearer we can
proximate to these conditions the
tter. A good plan is to have the
school children in the silo every after-
noon for the week or so that filling is
going on. If this is done it is re-
markable how the constant trampling
consolidates the mass.

As to crops for an eighty-ton silo, in most districts it should be filled twice a year. In November with a mixture of peas and oats or some similar crop, and in April with maize or amber cane. The area under crop (on the basis of land that will give two tons of hay to the acre) will be 15 to 20 acres of oats, and 6 to 10 acres of maize. Eighty tons will feed thirty cows 33 lbs. a day each for six months. It will, thus be seen that a small amount of cultivation will yield an immense amount of fodder. In an ordinary crop of oats or wheat for hay, the dirty and inferior parts may be made into silage. Wild oats, docks, and sorrel can all be used without any fear of the seeds germinating again. Not that they make the best of silage, but there is no other way by which as good results may be obtained. In making silage the crop ought to be fairly mature—a cereal crop, for instance, nearly as far advanced as when you cut it for hay, and a crop of maize should have the cobs at the stage of the glazing of the grain. Silage made from a mature crop is of higher quality than that made from one that is too green. It is better to let the crop get a little too ripe and use a few buckets of water to moisten it as it goes into the silo, rather than to cut it in too early a stage.

In feeding silage remember that as a rule it should only form one portion of the feed for the dairy herd. It requires to be supplemented by such materials as oaten chaff, crushed peas or beans, or by bran. A little of any one of the latter, say, two or three lbs. a day, will add the necessary flesh-forming constituents to the fodder. Of oaten or wheaten chaff 6, 8 or 10 lbs. a day should be given, depending on the quantity of grass there is available in the grazing paddocks.

Looked at in this way, a good silo well filled is equivalent to a big bank account. In times of scarcity you may draw again, and when the cows are getting all they require in the paddocks the silage will keep with very little loss till it is required again. There is no doubt that better feeding is the chief thing required to effect a big increase in the milk yield, and therefore in butter production. The sooner this is realised the better. If we can get double the present results by culling our herds and feeding them better, it means that double the profit may be made with very little attitional work. At all events, the amount of labor involved will be far less than by any other method. For the only other way is to keep and milk double the present number of cows, which means, of course, approximately twice the amount of labor at present involved. It ought easily to be practicable by culling and feeding, to raise the average yield of milk from 300 to 600 gallons a year.

Dairy Skimmings.

Where silage is used, feed as much to cows in milk as they will eat. The more of this they take, provided they digest it, the more milk can they give, and from silage the milk will be rich and good. Cows fed upon hay can only give a little milk, and the cream is scanty and poor.

A noted writer says there are four C's to look after sharply in successful dairying. They are cows, care, comfort, and cleanliness. After a careful study, and as a result of many experiments, the dairy department of the Ontario Agricultural College announces that the question of the care of milk may be boiled down to two simple propositions: (1) The milk must be clean; (2) the milk must be cool. So far as the care of the milk is concerned, cleanliness and cleanness are the two C's which spell the greatest success in this connection.

The production of milk and butter-fat by dairy cows under normal conditions increases with each year, up to the fifth and sixth year, when the cow is at her best. The length of time she will maintain her maximum production depends on her constitutional strength, and care with which she s fed and handled. A good dairy cow should not show any marked falling off until after ten years of age; many excellent records have been made by cows older than this. The quality of the milk produced by heifers is somewhat better than the milk of older cows, for we find a decrease of one to two-tenths of one per cent. in the average of fat content for each year till the cows have reached full age. It is caused by the increase in the weight of the cows with advancing age; at any rate, there appears to be a parallelism between the two sets of figures for the same cows.

Growing Six-Row Barley.

AID TO PROFITABLE FARMING

In South Australian farming there is an overwhelming preponderance of wheat, so that the question whether the association with wheat of other crops will increase the average net returns from land is a pertinent question. Professor Perkins, who discussed this matter at length at the recent Agricultural Bureau Congress, expressed his belief that on many farms of the Lower North if six-row barley were grown in conjunction with wheat the average net returns from arable land would be appreciably increased. He estimated that average net returns from wheat, allowing for 16 bushels to the acre as a normal and possible average, and 3/6 per bushel as the average price for export, at £2 16/- per acre, representing two years' gross revenue. The cost of production was influenced by the personal equation—as low as 15/- and as high as 45/- and 50/- per acre. Taking everything into consideration, the cost could not be put down at much less than 40/- per acre. This left 16/- per acre to cover both two years' net profit and two years interest on capital value of land or rent. An average net return of this kind, in the opinion of Professor Perkins, limits the maximum value of good arable land in existing conditions of farming to £6 or £7 per acre.

— Climate Suits Barley. —

The adaptability of six-row barleys, or Cape Barleys, as they are generally referred to here, is described by Professor Perkins, who says:—In South Australia six-row barleys will thrive wherever wheat has been found to do so. That these barleys are quite as drought-resistant as wheat, if indeed not more so, there is not the slightest doubt. In Egypt, in the immediate neighborhood of Alexandria, the average yearly rainfall is about 7 in., and it is found there that six-row barley is the only crop that can be grown satisfactorily without irrigation. In Tunisia and Algeria six-row barleys altogether displace wheat in the hot, dry, agricultural areas in closest proximity to the Great Sahara Desert. This power to withstand drought, six-row barley owes very largely to its rapid growth and its ability to ripen off its grain in a shorter period than the earliest of wheats. The Roseworthy records show that in the period of six years, extending between 1906 and 1911, King's White wheat — the earliest wheat we have—averaged 126 days between germination and full bloom; and that Square-head barley—one of our selected varieties—averaged exactly the same number of days between these two periods of vegetation. On the other hand, whereas in the same period of years, between the full bloom of King's White and the ripening of its grain there elapsed an average of 50 days, the same period was shortened to an average of 38 days in the case of the barley. And we all know that in a period of 12 days much may happen in the course of a hot summer that may prove detrimental to the perfect development of the grain. In brief, then, in the opinion and experience of those countries in which six-row barleys are chiefly grown—namely, North Africa, Asia Minor, Southern Europe, etc.,—they are looked upon as harder than wheat under droughty conditions of climate. Barley is reputed to fear frosts, and no doubt in this direction the resistance of wheat is greater. As a rule, frosts are not sufficiently severe to the north of Adelaide seriously to interfere with the good growth of barley.

— Position of Six-row Barley in Rotation. —

We are all in accord as to the position that should be given to wheat in any rotation in which it is made to enter. It must be either preceded by bare fallow or by a crop calculated to improve the general fertility of the soil, to crowd out and prevent the seeding of weeds, and to leave the soil in a condition that permits of the preparation of an adequate seed bed. Six-row barley is, in this connection, far less exacting than wheat; and the fact that, if anything, it fears an excess of fertility enables it to follow with advantage a crop that has already partially exhausted the available fertility of the soil. There are few weeds, too, that a well-grown crop of barley cannot crowd out and get better of. Nor is that consolidated seed bed, that it takes us so many months to build up for wheat, essential to the success of barley. It is for these reasons, therefore, that, in my view, there is no crop that follows wheat, that has been preceded by a year of bare fallow, to better advantage than Six-row barley. And I venture to suggest, as likely to prove more profitable on many a lower north farm than the rotations usually in use, the following alternative rotations:—(a) First year bare fallow; second year, wheat: third year, barley; or (b) first year, bare fallow; second year, wheat, third year, barley; fourth year, pasture.

— Barley Increases Net Returns.—

The more general use of barley on lower north farms will tend to an increase in the average net returns from arable land. I shall now proceed to show the extent to which I imagine that this is likely to be the case. For the purpose I shall take the three-year rotation suggested by me, viz. — (1) Bare fallow. (2) Wheat, and (3) Six-row barley, which, in so far as average net returns are concerned, must be compared with wheat and bare fallow alternating continuously. It should be added that the same arguments will hold good where a year's pasture is made to intervene every third or fourth year. I shall, in the first place, assume that the cost of putting in and taking off a crop of six-row barley remains approximately the same as that adopted for wheat, viz., 20 an acre. Such, at all events, is our experience at Roseworthy College. As in the case of wheat, average gross returns are dependent on average yields and average prices. Unfortunately, the returns from the Statistical Department have not distinguished until quite recently between Cape or Six-row barley on the one hand, and English, malting, or two-row barley on the other; and in my experience the yield of six-row barley is under our conditions of climate, between 25 per cent. and 33 per cent. higher than that of two-row barley. I find that between 1901 and 1911 the aggregate yield of these two types of barleys was represented for the State by 16 bushels 23lb. Over the same period average yield of wheat was represented by 9 bushels 13lb. We have, however, grown six-row barley on the college farm fairly extensively for the past eight years, and a careful record of its average yields has been kept. From 1904 to 1911 six-row barleys averaged on the Roseworthy Agricultural College farm 36 bushels 23 lb., whilst in the same period of time wheat averaged 18 bushels 32 lb., i.e., six-row barleys yielded exactly twice as much as wheat. Hence, since I have assumed an average yield of wheat for the Lower North of 16 bushels to the acre, 30 bushels of six-row barley cannot be looked upon as an extravagent average to suggest. To those who are without experience of this crop, and to whom the yield may appear high I would point out that on the college farm we have frequently secured from six-row barley yields of 50 bushels to the acre, and in exceptional cases even higher. In any case, if the average yield of six-row barley is to be reduced in these estimates a corresponding reduction must be made in the average yield from wheat, and the arguments to be derived from the higher yields will still hold good. The market price of six-row barley is subject to more frequent and violent fluctations than is that of wheat. I find, however, that for the period of 10 years extending between 1901 and 1910 Cape barley has averaged on the Adelaide market slightly over 2/7 a bushel. If, then, we adopt this figure, together with 30 bushels an acre as an average yield, we shall find the gross average returns from six-row barley to be represented by £3 17/6 an acre.

— Average Net Returns.—

A comparison between the average net returns of wheat grown regularly after bare fallow and a rotation in which a crop of wheat is always followed by a crop of barley is given below. For the purpose we must take into consideration a period of six years, in which on the one hand we shall have three crops of wheat to our credit, and on the other two crops of wheat and two crops of barley.

Preparing land, putting in and taking off three crops of wheat £6; returns from three crops of wheat, £8 8/-; Balance available to meet six years' interest on capital value of land and net profit, £2 8/-. Receipts £8 8/-; Expenditure, £8 8/-.

Preparing land, putting in and taking off two crops of wheat and two crops of barley, £8; Returns from two crops of wheat, £5 12/-; Returns from two crops of barley, £7 15/-; Balance available to meet six years' interest on capital value of land and net profit, £5 17/. Receipts, £13 17/-; Expenditure, £13 17/-.

In the case, therefore, of wheat alternating regularly with bare fallow, the average net returns available to meet both interest on capital value of land and net profits average out at 8/- per acre per annum.

Average Net Returns from Land in which Wheat after Bare Fallow is succeeded by Six-Row Barley.

When, on the other hand, a crop of barley is made to follow wheat which has been preceded by bare fallow the balance available to meet interest on the capital value of land and net profit is represented by 19/6 per acre per annum.

— British Market Will Absorb Surplus. —

It has sometimes been put to me — aod with good apparent reason, I think — that if Six-row barley were grown at all extensively within the State it would soon become a drug on the market, which farmers would find it difficult to dispose of. If I thoubht that such was likely to be the case I would not dream of advocating its wider cultivation. As a matter of fact, however, I firmly believe that the reverse would be the case. I have already referred to the violent fluctuations in price to which barley is in present circumstances exposed on the local market, subject to periods of glut natural consequences of a somewhat limited local demand, and an average supply insufficient to warrant the opening up of a regular export business. In other words, as we stand at present the barley market is like the pig market subject to periods of glut and periods of scarcity, when, as it at present the case, the locally-grown article cannot even be quoted. Indeed, so irregular and scanty are the usual local supplies that buyers, I understand, always experience the greatest difficulty in purchasing outright 100 bags or so of even sample. From personal experience I know that our usual yearly contribution to the market, of 1,000 bags or thereabouts, is eagerly competed for, and always realises higher prices than those quoted at the time. Great Britain draws her barley supplies from all parts of the world and we contribute but an infinitesimal share towards them. Between 1907 and 1911, the total British imports of barley averaged yearly 45,762,397 bushels, valued at £6,697,013, or over 2/11 a bushel at the port of landing. In order to realise what these figures imply it is worth noting that between 1901 and 1910 the average yearly total exports of wheat (including flour expressed in terms of wheat) from the Commonwealth as a whole were represented by 29,788,653 bushels, i.e., not much more than one-half the number of bushels of barley imported annually by Great Britain. In the circumstances, therefore, the British market alone is quite capable of absorbing any exportable surplus of barley that is likely to be produced by South Australia within our times.

The above extracts are from a recent issue of the Advertiser. The full text of Professor Perkins' valuably suggestive article appears in the October issue of the Agricultural Journal.

Virtues of Farmyard Manure.

One of the most difficult problems which presents itself for solution to the agricultural chemists is the value of dung as a manure. It is inconsistent with the times in which our lot is cast to view any fertiliser with superstitious reverence, or even to attribute to it occult or mysterious properties. It may be at once allowed that farmyard manure is a many-sided substance, the value of which cannot be measured by chemical analysis. Still, each aspect may be separately considered, and, what is even more important, comparisons may be instituted between the results obtained from dung and other fertilisers. To treat at length of the mechanical hygrometric, chemical, bacterial, or other aspects of farmyard manure would be impossible within the limits of a short article, but it is clear that the veneration with which it is regarded by old country farmers is due to the effect of a number of properties acting simultaneously on the land and on the crops. Viewed as a fertiliser pure and simple, dung is not rich in the most important constituents required by or removed by crops, namely, nitrogen, phosphoric acid, and potash.

In summing up its direct value Professor Aikman writes as follows: (1) "It contains a very small quantity of the three (principal) fertilising ingredients. (2) The proportion in which these are present is not the best proportion for the requirements of crops. (3) The form in which a portion of these ingredients, nitrogen and phosphoric acid, is present is not of the most valuable kind." In this estimate of the direct value of dung Professor Aikman is in complete agreement with other authorities who base their opinion upon the firm foundation of chemical analysis. In endeavouring to explain the high estimation in which yard manure is held, great importance is attached to its mechanical action upon the land, whether heavy or light, for it tends to open retentive soil and to consolidate those of loose texture. The mass of carbonaceous matter, although of no direct value as plant food, conserves moisture in the soil, and by its decay becomes a source of carbonic acid gas, which acts as a solvent upon the mineral matter in the soil. The decay of organic matter within the soil helps to keep up and increase the temperature of the soil to a slight degree, and these several functions are considered to explain the superiority of dung over other fertilisers. To these the accumulating value of dung must be added. It is a slowly acting substance which evolves its fertilising properties over a long series of years. Hence, land which has been repeatedly dunged is rich, and the effects of dung applied many years ago support those of more recent dressings and the general effect of repeated dressings of farmyard manure may be compared to a rope composed of many strands, which at last attains to great strength.

This comparision helps us to understand the permanently beneficial action of farmyard manure, but it must be allowed that the explanation is not as reassuring as the advocates of farmyard manure might desire. In the first place, it is claimed for dung that it acts upon the insoluble plant food in the soil and converts it into a soluble or available condition, but this is equivalent to an exhausting effect upon the potential fertility of the soil. Perhaps dung would be held by its advocates to be free from those stimulating effects which are supposed to detract from the value of nitrate of soda as a fertiliser, but this does not appear to be the case. The valae of the black decaying mass of yard dung lies in its power of preserving moisture, and its indirect effect through the carbonic acid gas evolved during its decay of decomposing the soil itself and liberating its mineral ingredients. Hence one of the functions of farmyard manure is to exhaust a soil of its mineral food. How far it promotes the evolution of free nitrogen or denitrification, and therefore is an agent for destroying nitrates, is another point of some importance. All these functions are simultaneously carried on, and while the sum of the effects is no doubt beneficial, it must be allowed that the effects are not all so. Farmyard manure is durable, and approaches permanence, as already shown, but this quality is inseparable from slowness, and hence those who favour artificial manure accuse dung of being extremely slow in comparison.

The mechanical values of farmyard manure may be considerable, but they ought to be reflected in the form of increased crops, as should every other valuable attribute of manure. Crop results, however, do not distinctly favour dung. The dunged plots usually come out well, but not prominently so, and if the cost of production of farmyard manure is even 5/- a ton, the costs of dunging an acre of land must far exceed an ordinary dressing of artificial manures.—Agricultural Gazette.

Rape for Green Fodder.

Rape is one of the most valuable fodder plants in cultivation. It is a very quick growth, and produces a large crop of succulent green feed. It has come greatly into favour during the past few years, and is now regarded as one of the best crops for fattening sheep and lambs, also for feeding cattle, pigs and poultry. There are several varieties of rape, but the Dwarf Essex variety seems to be the most used by the farmers. On good soils it will grow to 18 inches in height, but the writer has seen it on very rich soil to the height of 3 feet. It is best sown in drills at the rate of 2lbs. or 3 lbs. to the acre; for broadcasting it will take 6 or 7 lbs. to the acre. Cattle should never be turned into rape when hungry, as they would eat to repletion and run the risk of becoming blown.

Sheep and lambs should not be allowed to feed upon it too freely when the crop is in a young state, as it is liable to scour; therefore, the same precautions should be taken as for cattle. To counteract this tendency to scour, a little hay or chaff should be within reach of the sheep.

Rape is very highly recommended for pig feed, and they are very fond of it. But it is as a farm manure that rape is so valuable in recuperating worn-out wheat land. The stump and fibrous roots should be ploughed in, and the land rested for a sufficient time to allow the organic matter to rot and be returned to the soil, and the land will again grow a fine grain crop. Rape is largely sown with cultivated grasses, and adds much to the amount of food grown. As a catch crop, after a crop of grain or hay, it is excellent. If the scarifier is run over the land, followed by the harrow the seed sown broadcast, and the land rolled afterwards, it will produce a crop which be fit to turn ewes and lambs upon (for a few hours a day) in ten weeks; and when it is full-grown it will carry 12 sheep or six cows to the acre. The best time to sow rape in the coastal districts is in early autumn, when it will provide rich food for the winter and spring. Poultry farmers should grow this crop as green food for the fowls and ducks. Cows that are in milk should not be fed on it, as it is liable to taint the milk.—Exchange.

Season's Forecast.

Mr. John Lane, Clarence Park, writes :—"I am handing you my forecast for 1912, issued on October 26th, 1911, with supplementary report of April 3, 1912. The season has been very unusual. After a moderate rain in April a dry spell set in, and continued until June 7th, when heavy monsoonal rains reached us from the Gulf of Carpentaria. These were repeated early in July, and practically all the State received a splendid soaking. As the season advanced monsoonal and cyclonic activity gradually extended further southward in the Pacific, and produced good rains—first from the east, and later from the south-east coast of Australia. Pinnaroo country benefited every time, and for a while even the west coast participated. From August more normal conditions prevailed, and useful falls came as usual from westward. September, however, brought gales with patchy rains, which proved disastrous to crops, especially in the north and west coast districts. As October set in with duststorms and only light showers anything like a decent harvest was despaired of until early November, when a western monsoonal "low" brought about an inch over most parts, and greatly revived the prospects. Favourable weather has given the United States, including Canada and Argentina, a bumper harvest; but alternate drought and excessive rains have visited Europe, and reduced the wheat yield below the average. India had a dry spell, but this has now passed away. The controlling monsoon struck Australia three weeks earlier than I expected. This has modified some of my details, but the general character of the season has, I hope, justified the forecast, and shown its usefulness. My forecast for 1913 is now ready." The forecast for 1912, a copy of which Mr. Lane entrusted to the care of His Excellency the Governor, reads :—"As intimated we entered upon a period of less than average rainfall. This is likely to be continued during 1912, when I expect a total fall of under 16 in. at Adelaide, distributed as follows : — A very wet July, rather dry winter with patchy rains, dry rest of the year. The north-west monsoon in Australia will be feeble, and any rains from that source will not advance far inland. The northeast monsoon will, however, be stronger than usual, and will extend in a southwesterly direction inland, giving much of the Northern Territory a fairly good season. The summer in South Australia, although dry, will be rather cool, and no extended heat waves are likely. Fine, calm, settled weather of an anticyclone character, with the absence of cloud, will predominate throughout, but a few westerly gales accompanied by rain during the winter are probable. Wheatgrowing Period.—I expect an inch of rain during the last week of March, and another inch towards the end of April, but little again until the end of May, when good rains will extend well up north. June will be the wettest month. Heavy rains will set in over Riverina from the east-north-east of Australia, and will extend into this State (but not to west coast, or northward much beyond Hallett). This will bring a splendid fall of about 5 in. over most of our State. A reaction will take place during August, when only light rains totalling less than an inch will fall. In September the rains will be heavier in the north, but at Adelaide will probably reach 2in., after which only light showers with duststorms can be expected. Early in November the west coast may expect thunderstorms with good steady rains.

The season as a whole cannot be considered satisfactory for either agricultural or pastoral interests. No crops should be sown late, or on land that has not been fallowed. On new mallee land shoots should be burned to get rid of rubbish. There will be a low river, fordable in places. This will present a favourable opportunity for necessary improvements in locking. It is a matter for consideration of farmers, say, beyond Quorn, whether pasture will not be more remunerative than cropping with these conditions. Hay crops will be again short and the wheat average for the State is not likely to exceed 8 bushels. The west coast should take precaution for water conservation. My system, having world wide application, enables me to expect production over most European countries and India will be under the average, resulting in higher prices for wheat and wool. Supplementary forecast for 1912, issued on April 3rd :—The summer weather has not materially altered the prospects of the coming winter season from that reported last October. Some very hot, sultry weather alternated with spells of cool breezes, but the sun's rays were unusually severe; and, as anticipated the summer was very dry. Prospects point to a speedy break in the season which may occur at any time now—an early winter with an early summer to follow. Between April and September patchy rains, with sometimes rather long dry spells between, will not be very favourable to growing crops; but I am hopeful of there being fairly good grass. It cannot be called a monsoonal season, and rains will be chiefly of antarctic origin with average results, as previously estimated, at 8 bushels, and hay short. I do not expect much rise in the river until July."

The dairy bull is a big factor in the herd, but he is not the whole thing. The finest dairy bull bred to common cows will raise the quality of the calves, but he cannot mape them thoroughbred the first time, as some farmers seem to believe.

Care of Colts.

The value of good geldings on the market makes it of greater importance than ever before to take special care of the colts, to get all of the early development and size for the draft colts that is possible with good feed and care. The "English Live Stock Journal" gives an interesting article on "Backward Foals" that is equally applicable to care of colts generally.

Foals that are at all backward, and are not thriving satisfactorily, require some extra care at this season of the year in order to bring them on and improve their condition. It is of the greatest importance to the ultimate size of young horses that they should make plenty of growth in their first year. If a foal fails to grow and develop as it should do at that age, its size will in all probability be permanently impaired, and it is but seldom that any ground lost then is completely recovered in subsequent years. Young horse stock makes most growth in the first year, hence any check in the growth occuring then through any cause or other is most serious; as it usually leaves a permanent mark and cannot be subsequently remedied.

There are various reasons that may account for a foal being backward. It may be that it has been bred very late in the season, and in that case it is, of course, but natural that it should be backward and not so well developed at the beginning of the winter as the average run of foals. Or it may be that the foal's dam yielded a scanty supply of milk—owing to her naturally being a bad mother or to shortness of food—so that it failed to make satisfactory growth while sucking. Again, the foal may not have been sufficiently well looked after when it was weaned, and may have ceased to thrive on being taken away from its dam, being checked in consequence. It is a critical time for foals when they are being weaned, and if they are at all neglected at that stage, they are pretty sure to go back in condition and to cease thriving for some time. Some foals are weakly born, and that may account for their being backward; while illness always interferes with the proper growth of a foal. Foals that are bred from very old brood-mares are often undersized and lack vigour, and they are frequently small and backward when the winter sets in. The fact of a foal being infested by worms prevents it from thriving properly and from making satisfactory progress, and worms are often-times the cause of foals being unthrifty and failing to progress as they should.

In order to push along backward and unthrifty foals so as to improve their growth and condition, they must be liberally fed on nourishing food. But while supplying them with plenty of nourishment, the breeder must avoid giving too rich and too forcing a diet. Reasonable limits must not be exceeded in feeding, as the immoderate use of concentrated food in rearing young horses only does harm in the long run, and is decidly detrimental to their ultimate usefulness either for work or for breeding purposes.

For pushing along backward foals and encouraging growth and development, crushed oats and some coarse bran are most suitable, and these foods being perfectly wholesome and not heating, they can, therefore, be fed with a liberal hand. Coarse bran is a most useful food for helping young live stock to make good growth; as it contains a high percentage of mineral matter, in addition to being pretty nourishing, and the breeder should not omit to include some of it in the diet of a backward or unthrifty foal. A very little linseed cake is useful in promoting thriftiness and growth, and for improving the condition in the winter season when it is deemed necessary or advisable to do so; but too much of it is bad; as the cake is very concentrated and rich in character.

New milk, skim milk, and buttermilk may all be made use of for pushing along foals that are backward or that have stopped thriving. They bring on a foal wonderfully, and rapidly improve the condition. The results that can be obtained by feeding milk or butter-milk to weaned foals are surprising.

The inexperienced breeder must, however, beware of overdoing it in giving milk to a foal, as he may easily be led to do so on seeing how well a foal thrives on milk. Feeding milk, whether new, skim, or butter milk to foals is like feeding rich concentrated food. If too much of it is given, or if it is fed when not required, it may give satisfactory results for the time being in so far as regards getting a foal into well fleshed and fat condition for show or sale: but it proves injurious in the end. For this reason, the use of milk for feeding to foals is often condemned outright. This wholesale condemnation is, however, not at all justified, because, as stated, milk is most useful in pushing on backward foals and such as are not thriving. It must, of course, be used with discretion and in moderation, and when there appears to be no actual need for resorting to milk-feeding, it should certainly not be done, even supposing that the expense entailed thereby is not of any account. Weaned foals readily learn to drink milk or butter-milk out of a bucket, and in order to get them to take it at first, it is only necessary to let them get somewhat thirsty, and then to offer them the milk instead of water. Once they are used to drinking milk or butter milk, they become extremely fond of it as a rule. A feed of milk once a day is plenty. The breeder must use his judgment and discretion in regard to the quantity that should be suppl ed to the foal, and no hard and-fast rule as to the quantity that should be given can be laid down.

Though backward foals require to be well and liberally fed in the winter, it is a bad plan to coddle them unduly in other respects.

The common "lice" found on sheep may possibly draw blood at times but they do not possess the powerful piercing and sucking beak of the true lice. They never develop wings, and being, like the keds, always on the sheep, may be exterminated if sufficient trouble be taken.

Few farms allow for the depreciation of the soil. The accumalating overdraft owing to the soil will sooner or later have to be repaid.

Declining Fertility.

The observing tiller of the soil will notice that as his farm grows older a change takes place in the physical character of his land. Especially will he notice this change where grain crops have been continuously grown for a period of years, and where the soil has had neither clover nor stable manure with which to hold its youth. As it grows older he will notice that it inclines to be more lumpy and crusty, is not as lively as it was when new. When we pick up a handful of this old soil and compress it, we find it is not as elastic as the new, and when let go it does not spring apart and fall to pieces as it did twenty years ago. The fine, floury substance that works out of it when rubbed between the thumb and fingers is not in evidence as it was.

Why is this and what is the cause of the change? Nothing more nor less less than the soil wearing out, simply getting lean. The humus, or mold, that was for ages accumulating, is becoming exhausted. It has been worked out, washed out, and sucked out by growing plants. This is not to say the plant food has been used up, for the chemist tells us there is plant food in the soil sufficient to last for hundreds of years, but we cannot get it all out at once. It is what he calls unavailable food, the plants can't get hold of. He also tells us that Nature is provident in doling out her fertility. She gives it out slowly from year to year, and thus provides that man shall not rob the soil of all its fertility in his own generation.

She permits him to take out in abundance for the first few years after the virgin soil is opened up, while there is a surplus. She makes an excertain when this mold, this humus, the very essentials in plant building begins to grow less from year to year. The available surplus has been exhausted, and there will hereafter be a supply of food for the plants only as the elements of nature dissolve them and make available, as the sun, rain and frost unlock fertility, which one year with another will be barely enough to grow very poor, or at least, ordinary craps. In time, it becomes necessary to depend upon commercial fertilisers to stimulate that chemical action of the sóil that liberates plant food, to hurry it up as the whip does the tired horse. That is, force the soil to yield up its fertility faster, but at last there comes a limit even to this, and it becomes necessary to go back and rebuild the soil in nature's way, by returning that which has been taken out, turning under green crops, filling it with clover roots and covering it with manure. This is the most expensive way, yet the only way as a last resort.

The old country farmers have learned this lesson by hard experience, and they tell us that the longer we put off the day of replenishing, the more difficult it is to rebuild this rundown soil. It is like attempting to renew youth in an old man. There is but little on which to build.

The right way and the only good way is to keep it in a state of perpetual youth.—"Maritime Record."

There is no doubt that the low average production of our dairies will continue as long as dairymen depend for their supply of cows upon purchase from delaers.

Pea Vines as Silage or Hay Equal to Corn Silage.

In a discussion on the disposition of pea vines, after being run through the thresher, the American Agriculturist states that "In 1908 the product from no less than 105,000 acres at various points throughout the country were packed in the silos, the same as maize silage, while another very popular method is that already mentioned, of stacking the vines carefully in large, well-compacted stacks.

"A well-drained location for the stack is needed, since the vines contain large amounts of moisture, and if this is not permitted to drain away fermentation within the stack will be too great and the feed injured. At some points packing of vines in the stack is done by leaving a sloping side to the stack, up which the horses may be taken and driven about to thoroughly tramp the vines. Others employ several men upon the stack to tramp about and compact the feed as it is delivered. If these precautions are taken, not more than 8 inches of the feed on the outside of the stack should be unfit for use. Where the vines are packed in the silo, they may be used either just as they come from the field or may be first run through the silage cutter. If they are not cut, it will require mote labor inside the silo in packing them.

"Opinions vary somewhat, as yet, as to the comparative feeding value of pea vine silage. The majority of those who have used it as a dairy feed prefer it to corn silage, while there are others who have found it only equally as good, or not so satisfactory.

"This silage has been found especially valuable for late summer feeding, between the period when pastures usually fail and the time when new corn silage is available. Pea vines have little value as a fat producer, but are highly regarded as a supplementary feed in finishing cattle or sheep. It is a good conditioner and enables animals to make better use of whatever fat-forming feeds they do receive. A considerable number of sheep are fitted for market by the use of this silage in connection with grain both in New York and Wisconsin. In the fall of 1908 a lot of 442 western wethers that had been fed on pea vine silage and corn in Wisconsin for fifty days topped the Chicago market for heavy export sheep.

"When the vines are dried for hay they are consumed by horses, cattle and sheep with great relish. Many dairymen prefer it to clover hay as a roughage. Many think peavine hay is an especially good feed for thin, overworked horses and mules which it is desired to put in good condition. To get highest value from vines as hay especial attention should be given to the drying process. Since the vines are very juicy and full of moisture, they should be carefully turned and spread in order to avoid molding or fermentation."

The Care of Farm Animals.

There seems to be an increased—and, indeed, much-needed—tendency to give stock more care. This is a commendable step. It redounds greatly to farmer's interests that all his animals should be in sound and vigorous condition, for thereby are losses greatly minimised which would otherwise have occurred had the system of the beasts been laid open to the inroads of disease by the weakness resultant from lack of tone and poorness of blood. The majority of old time farmers used to make a point of looking over their stock every day. This is a wise plan, for the eye soon becomes critical and sees at a glance an ailing cow or heifer, a pig out of sorts, and so on. When one hears of cases where sheep have been found in ditches fairly eaten by the fly because, the farmer being short-handed, they were only cursorily looked at two or three times a week in the far-lying grass paddocks, the need for keeping an eye on them becomes profoundly apparent. Then too, seeing that most of the stock, bovine, ovine and porcine, is bred and fed for human consumption, it is a public duty, no less, to provide the meat markets with healthy flesh The fundamental principle is breeding from sound parents with no taint of disease to run through their progeny. Next, the providing of sound wholesome food in sufficient quantity to make good blood and properly nourish and maintain the body. Next, to see that the general management, housing, etc., is what it should be. Light, cleanliness and fresh air in all buildings are points to be studied. Keep the farm land sweet, clean, and in good heart. Land is often badly infected by the parasite pests passed in the execreta of infested animals. If you are laying down or resowing, see that your grass seed is of the best. The care of a head of stock is a matter of great responsibility and needs unremitting attention; the farmer is, indeed, one of the busiest and hardest worked of men if he overlooks things personally—and if he is a wise man this is what he will do— and faithfully carries out his many and varied duties. On the farm, and especially the farm devoted to the rearing of live stock, the master's eye must glance keenly everywhere if things are to prosper and pay.

The Bacon Pig.

There is more in breed than meets the eye. We look to the Berkshire as our readiest fattener, to the Large White as our nearest approach to the ideal baconer, to the Tamworth as a pig with a future when the average are raised to the level of the best as they appear in the biggest company, to the Large Black as the farm pig which can pick up a good living by foraging. These qualities are bred into them. They are as much part and parcel of the breed as the inherent qualities of colour and type.

In-Foal Mares.

Those new to mares in foal are often so anxious about them that they are not allowed to do any work for a month or two before foaling, and are treated as more or less of an invalid. If a mare is old or disabled, and only fit for a brood mare, let her have ease by all means, but when the in-foal mare is one of a team, long idleness before foaling disarranges the condition of things to her dis advantage, and a long rest before foaling is quite unnecessary. If the mare is one that is driven or ridden give her a chance, and do not hurry or bustle her about during the last month or six weeks of her carrying the foal, but she can be used quietly all the same. If she is employed for carting or ploughing, etc., on the land, avoid giving her jerky work. This may cause premature birth, but steady employment will do her no harm whatever—indeed, have an opposite tendency.

Working the Mare after Foaling. —

Now we come to something quite different, and after foaling there must be complete idleness for a time. The mare must not be heated when the foal is very young, as her milk, when in that state, is bad for the foal. Young calves will rub on nicely with two meals a day, given morning and evening, but the foal is a more frequent feeder, and the mare should be available for this practically constantly for the first month or six weeks at least. I have known them worked two or three days after foaling, but this is very unwise, as the foal is sure to get upset, and what is gained in work will be all lost in the unprogressive condition of the foal. As in all live stock, a good start is of immense advantage to a foal, and if put well on their legs during the first few weeks they will be better prepared to bear the mother's absence for intervals later.

The Jibbing Horse.

When a young horse dislikes the collar and threatens to become a jibber, a tandem will reassure the horse, and probably cure him of the objectionable habit. Such a horse should be put in the shafts behind a good, sharp leader, which latter will start the load, and when once set going the horse with shy shoulders will often do more than his share of the work.

If the whip be used, or any voilence practised, the jibbing horse will not be cured. He must be coaxed, and treated with every kindness, and then he will gradually understand that there is nothing uncomfortable or exacting in harness, and he will settle down to steady work. To those who keep a number of horses there is no expense in tandem driving, except the purchase of harness, and more than half of that is available for single driving.

The preparation of the seed bed is a matter that succesful farmers never neglect. The practical farmer knows that time is well spent in thoroughly pulverising the soil.

The raising of good cows is coming each day to be more of a consideration for the dairyman. The demand for reallly good dairy cows has grown mendously.

Poultry Notes

Care of Young Turkeys.

Little turkeys should be protected from the weather. If we can get them past the time when they "shoot the red," as it is called, which means when the rough bunches on their heads and necks begin to show red, they can stanh the weather better.

I have practiced pulling the first flight feathers on wings, as those grow so fast that they sap the strength of the little turkeys, and their wings sometimes drag on the ground. They make much faster growth when these are pulled. Some noted breeders say they have tried it and think the next feathers coming in are not marked well, if the first are pulled. I am inclined to think they are mistaken. I believe more turkeys are killed by over-feeding than by under-feeding. Over-feeding is the greatest cause of liver trouble. People raising turkeys like to see them eat and grow, but have never followed their turkeys in the fields to see how they pick up their food. They eat only two meals a day, starting for their breakfast shortly after daylight and picking along until 11 o'clock. Then they go under the shade and rest and digest their breakfast, always going where they can get water, if possible. About half past two they start towards home, and it is about sundown when they come aronnd the buildings. They don't bolt their food, like some of the human race, but eat slowly, digest their food properly and have good livers. When we do the feeding we think if the mill will grind we can keep right on stuffing it until the machine clogs; but that will not do.

Parties have written me to ask how much egg I feed young turkeys. I start with very little and sometimes they will not eat all of that, for if you have ever dissected a very young turkey you have found that the capacity of the crop and gizzard is very small. It takes a while to get the digestive machinery started. When you feed a lot of incubator chickens, they will at first pick up a little in an indifferent way, as though they did not know what their bills were made for; but wait until their digestive organs get fairly started and they will tumble over each other in their eagerness for food. A turkey has a voracious appetite, but nature made them gather their own food in the fields and woods. I feed egg alone only two days and I have been sharply criticised for feeding any at all by some prominent breeders, but my turkeys live and grow strong, and plump, and smooth. After the first two days dandelion leaves, onion tops and cottage cheese make a large part of their food. The green food keeps their liver in good running order and that assists the whole system. They can eat more of that in safety than of such food as grain. I know that many people feed meal in some form, but I never did without losing my turkeys. I feed oat meal after the turkeys get to be two or three weeks old, or chick food, or millet seed, or any kind of small seed.

The question of killing lice is a vital one, that must be of absorbing interest if you would succeed. You will think there are no lice on the fowls or turkeys until you look between the quill feathers on their wings, then you will find lice so small that they can be packed into the hundredth part of an inch, but enough to soon cover the turkey, unless they are promptly killed by some kind of lice powder.

Ducks.

Ducks have an individuality all their own, which must be recognized and catered to, where they are successfully reared. They will not prove a lucrative investment if kept in damp, dirty, ill-ventilated quarters; or if over-crowded or improperly fed; or if left unprotected and exposed during cold storms.

On the other hand, they will withstand almost any amount of weather, if at night they have a tight roof over them, plenty of fresh air, and dry, clean bedding under them.

It is wild extravagance to treat them the same as other fowls. Their habits and their insides call for totally different treatment. They require very little exercise; simply fill up, sleep, digest and fill up again. With ducks it is bulk that counts; not quality of food so much as quantity. They are not comfortable or happy with a handful of hard grain rattling around in their big insides; but given the weight of that grain in a mash, they wink their eyes at you and subside in blissful content.

Especially during fattening time, when yarded, they must be kept quiet and not frightened. They are gentle, timid creatures and seem to especially feel their helplessness to defend themselves, when confined in small yards.

The Summer Care of Chicks.

From the American Poultry Journal.

Preparatory to a successful campaign during the summer months, much better results will be had with chicks hatched from eggs laid by breeding stock raised according to the laws of nature, not after the "hot house" style, but rather on the order of "roughing" it. Dry mixed food, sunshire, pure air and sanitary range and conditions insure hardy breeding stock, and chicks from such stock properly brooded and fed are in prime condition for rapid growth and development during the summer months.

For my method of rearing chicks, no brooder has sufficient ventilation and except in the severest weather the lids of the brooders are kept well propped up. Nature provides an abundance of fresh air, and does not keep any of her young cooped in tight boxes with holes at the sides. By artificial brooding we bring together more chicks than nature intended, thereby causing more filth and putrid air. We must therefore provide as much ventilation as possible to purify this unnatural condition.

— Dry Food Develops a Sound Organism. —

The food given during early chickenhood has much to do with preparing chickens for summer food and forage. A chick fed dry food has by the exercise necessary to digest such food developed its digestive and assimilating organism to the highest state of efficiency, and is therefore in the best possible condition to digest and convert into bone, muscle and feathers the numerous particles of food and grit picked up on a summer range. This sound organism is the foundation of health, and health is the principal factor requisite for strong and natural development.

These facts have been so strongly demonstrated by experiments, that I practice the dry food system, both for growing chicks and breeding fowls.

Chicks thrive on a variety of food, yet care must be taken to have this variety contain as nearly as is possible all the elements necessary to produce growth and development. A balanced ration is a mixture of food substances containing the proper proportion of chemical properties necessary to supply the physical wants in either animal or fowl.

— Beef Scraps Supply the Necessary Animal Food. —

Protein is one of the necessary elements to promote growth. In fact, it is the substance from which muscle and lean meat is almost wholly formed, and is commonly called the flesh former.

Summer Coops for Chicks.

There is no particular style of coop that is better than any other for housing chicks during the warm weather of summer and early autumn, but there are advantages that each must have, or the youngsters will not grow and prosper.

It must be remembered that fresh air is as necessary for chicks to breathe at night as in the day time, and that a group of vigorous young birds generate considerable heat which must be permitted to escape from the coop in which they rest.

It is not unusual to find a flock of half-grown chicks crowding every night into a small coop. On warm nights the temperature will run high in such coops and the occupants will loose in the night all the strength that they gain in the day time. When the chicks are let out in the morning one can feel the hot air as it escapes.

Coops should be large enough so that the chicks can sit down without crowding and so well ventilated that the air within the coop is not much warmer than that outside. Openings made for this purpose can be covered with wire netting to keep out animals and protected by hoods to exclude rain. These openings should be located, preferably near the top of the coop, so that drafts cannot strike the chicks when the wind blows. For additional comfort during very warm nights, the front of each coop can be made of wire, over which it may be arranged to close a shutter in cool, or wet weather.

Money and time spent to make comfortable, healthful coops will prove a good investment.

Two of the Leaks.

There are holes in the poultry business that mean much waste, and if this business is to be made a success they must be discovered and stopped up just as any other business man applies business principles in the various departments of his work.

One of the worst leaks in small poultry plants is false economy in feeding. The man who has made a success and has gradually built up a large poultry business has learned that only by maturing his young stock quickly to the point of market fitness or egg production can he make a profit on them. And he has likewise learned that to do this he must feed liberally and frequently and a large variety of food. In other words he has learned that he must cater to the appetite of his fowls—his chicks especially—and must stimulate their appetites to large food consumption in order that the same food may be converted into good flesh.

Now fowls, old and young, if confined to limited quarters, will soon get tired of one or two kinds of food. The hen that has free range from the break of day until dark and has acquired the habit of foraging for her own living, will eat almost any kind of food that may be thrown to her and be glad to get it. It is just that much of a gift to her—she was not expecting it. But limit that hen to a small house and a small yard. Allow her to have only what is carried to her and then limit her bill of fare for a week and see what she does for you on a narrow ration. She does little and pays you less.

But some one says, "I don't confine my hens for a week to any one grain. They get some of each every day. Suppose they do, how does that compare with the almost unlimited variety the hen gets that roams at will eight or ten months of the year on a large farm. The bits of fresh grass, lucerne, the cabbage patch, the orchard and the grain field—each is open to her and each furnishes something different, so that she comes in contented at night, with a full crop and a disposition to pay it back later with good fresh eggs.

Now it is sad and expensive economy to deprive the hen in confinement of the very things she craves for and secures when at liberty. And the growing chick is just like the mature hen in this particular; to persuade it to eat much you must cater to the peculiarities of its appetite. You can well afford to feed it all the variety of one-penny-a-pound food you can persuade it to consume to get sixpence-a-pound flesh in return.

Another serious leak is in false economy in buildings. The writer is by no means an advocate of expensive houses; on the contrary, he urges that all that is necessary is comfortable houses, and that these are not expensive. But he does urge most strenuously that it is very foolish to crowd many birds of different sizes and ages together.

Just now the temptation to do this is very strong. To drop a few half-grown pullets in with a pen of mature hens, or to place a dozen of summer-hatched cockerels in with the early ones or even with the old cocks themselves. What is the result? Disaster. The youngsters are pushed into the back ground by the stronger birds. They perch in some draughty place and are crowded or driven from the feed trough. They weaken and

icken ; cold develops into roup ; ealth and vigor give way to ickness and decline, and you soon ave a sorry lot of stock on hand -old and young suffering from the revailing contagion.

— In Brief. —

Keep the sexes apart.

Separate old birds from young.

Divide the early birds from the ite.

Make more pens.

Keep birds of the same kind and ge together.

Far better to kill and dress or ven give away a lot of the late oungsters than to crowd them in ith the larger stock.

The Breeding Male.

More than one good male bird as been prevented from demontrating his excellence as a breeder y reason of his being condemned y good judges. This was brought mind a few days ago while ooking over a flock of chicks just rought in from the farm. Their re was a cock that had been irly successful in the show pen, ut that had been pronounced erv much inferior as a breeding ird to a brood brother by all the ood judges who had seen the pair. s a result the bird had never een used in the breeding pen ntil last spring, when a particurly tempting offer for the supposed superior brother made it ecessary to place him at the head f the pen.

The chicks from that pen not nly surpass those from every ther mating in the same yards is year, but are also far superior those produced by the pen eaded by the supposed superior ird last year.

Live stock men in almost every ranch of breeding can call to ind an instance where some mous animal was given an opportunity to demonstrate his uselness after being condemned by a rominent breeder and given a iance by some one who secured m because he had been rejected.

No owner of a good bird, the inritance of which is known to be hat it ought to be, and, although t a show bird of the highest ass, but still capable of attaining little success in that direction, justified in discarding him, as a eeder, without giving him a test.

A male bird capable of transitting to his chicks the qualificaons which go to make up his breed type with great uniformity is almost beyond price to the breeder. Such a bird is unquestionably often disposed of by the best breeders without having been given a trial. Some one of his brood brothers, with something to his advantage as a show bird, but lacking in prepotency, having been selected instead.

It may be said that by the time a trial has been given to several male birds they will have passed the age of usefulness, but I do not agree with those who limit the usefulness of a male bird to two seasons. Treated in an intelligent manner a male bird may be used for a far greater length of time than is generally considered possible. Some of the best show birds I have ever raised have been from a mating of a four-year-old cock on a pen of pullets. I have even used a five-year-old bird with success.

Of course when one finds himself in possession of an unusually good male bird, judged by the excellence of his chicks, it behoves him to husband that bird's procreative powers jealously. Mate him with a small number of females and when the breeding season is over remove him from the breeding pen and keep him away until the next breeding season.

The breeder who would attain the best results should not discard a promising male bird without testing him as a breeder and once having secured one should husband his powers by giving him the same care that breeders of other stock give to the males selected to head stud, herd or flock.

A Specialist.

Some people have very large heads, writes an American breeder, but it seems to me a person's head must be extra large if he can find room there for all things he should know if he intends to raise several varieties of fowls.

The men and women who have succeeded raising poultry are mostly specialists.

A person can find enough to learn about one variety that will require all his time. See if the leaders in the poultry world to-day the ones that have made the most out of the business, are not specialists.

A great many people are thinking of entering the poultry business. Some will rush in head over heels, spending a small fortune for land, buildings, incubators and other fixtures, securing a dozen varieties of poultry.

No wonder so many quit in disgust, saying there's no money in chickens. It takes years of hard study, to learn this business so as to make a success. In one year's time some expect to know all, to strut around with silk hat, gloves, pressed pants and pockets bulging with coin.

They discover instead of making money they lose money, quit, grumble about nothing in chickens.

Be a specialist, select the variety you like best., Place all time, study and money you have to spare on them.

You may find your head a trifle small to hold all needed about this one breed. Keep continuously at it. Study harder. When you have money to spend invest in something that will improve your strain. Take time and don't rush.

A good way is to attend a poultry exhibition where all varieties are at their best. Make your selection and stay by it.

Learn your chicks from beak to toe-nail, then you can succeed.

Packing Poultry for Ship or Rail.

The following suggestive article is from Reliable Poultry Journal. Much that is written therein applies equally in this country.

It is an advantage to buyer, seller, and all others interested in the advancement of poultry culture, to have consignments of pure-bred fowls, forwarded for any purpose, arrive at their destination in good condition. On that account it is the duty of every poultryman to furnish everything required for the safety and comfort of the fowls en route when he prepares them for transportation. Whatever may be said for or against the manner of handling consignments by the express companies does not relieve the shipper of responsibility for properly cooping the fowls delivered into their hands. Although the last five years have brought about a wonderful improvement in the quality of shipping coops used, further improvement should be encouraged. Good coops can now be bought at fair prices; in most instances less than it would cost the poultryman to make them. Purchasers cannot afford to pay express charges on birds which are not worthy to be shipped in substantial, comfortable coops.

It pays the breeder to ship in attractive coops. They command more respect and receive better care from the handlers en route, and if an appropriate label, bearing the breeder's address and enumerating the varieties bred, is placed upon them, they become a means of advertising which sometimes yields good returns.

— Coops for Shipping in Cold Weather. —

To reach their destinatioon in good condition, fowls forwarded in cold weather must be protected from drafts, but supplied with plenty of air to breathe. The coops must, therefore, be built with sides and ends wind proof to a height greater than that of the bird when standing naturally, and air must be admitted through the sides, near the top, of through the top itself. An opening an inch wide, extending the full length of one side, two or three inches from the top, and an aperture of the same size in the top, near the opposite side of the coop, will serve the purpose.

Solid sides and ends, with the top covered with slats placed half an inch to an inch apart, is a popular mode of construction and gives excellent satisfaction. But when the walls of such a coop are reasonably tight, and the slats on the top are thin, any flat box or package placed upon it, while in the car, may blanket the open spaces and reduce the ventilation almost to the danger point.

Such a contingency may be avoided by fastening strips of wood half an inch thick across the top of the coop, upon and at right angles to the slats, so that air will pass under any obstacle placed above them.

When air is admitted through both the side and the top there is less danger from an insufficient supply, but precaution is advisable in all cases.

All openings, whether for ventilation or convenience, should be too small to permit the fowls confined to thrust their heads out of the coops, in order to avoid possible damage to the fowls from contact with doors and other packages.

Coops built ol wood are the most serviceable and afford the nearest to complete protection to the birds. If the express compgny allows the consignment to remain for some time on an exposed depot platform, the wood coop coop keeps out the cold wind, or if the shipment is piled up against the hot steam pipes in the express car, the wood protects, to some extent, against the heat. Some other materials that offer as much protection and cold and heat are too easily damaged by pressure or by water to be safe and lasting.

— Size of the Coops. —

No bird, for which the purchaser pays his good money, should be delivered in a coop that prevents it from standing comfortably in a natural position, whether the journey is for fifty miles or across the continent. Every specimen forwarded should have room enough to stretch to his full height and to scratch in the litter on the bottom of the coop for its food. This is not to imply the necessity of an exercising area in every coop, but to urge the adoption of coops of reasonable size. For a fowl of the American varieties, a width of twelve inches and length of eighteen inches is sufficient, unless the journey is one of more than two days' duration. When more than one bird is to go in one compartment no greater number should be put than can sit down together upon the bottom of the coop comfortably, with a little room to spare.

Casual notice of the consignments of fancy poultry that are handled by the transporation companies cannot fail to call forth well deserved criticism in many cases. Coops are seen that are so flimsily constructed that it is only by good luck and the express messengers' makeshifts that they confine the birds to the end of the journey. Other coops are strong and heavy enough to hold a wild-cat and far better adapted to that purpose. It is not uncommon to

see a large male in a coop so low that the bird cannot straighten its legs, to say nothing of lifting its head, or to find a pen of half a dozen birds crowded into a coop large enough for no more than half that number.

Consignors who send out stock cooped in such ways and others who have no thought for the comfort and health of the fowls forwarded, have no valid claim upon the poultry business for support. Fortunately such men are seldom found among the advertisers in the best poultry papers.

It goes without saying that two males should not be placed in the same compartment. When shipping to any considerable distance it is wise to separate the males from the females, or an ill-tempered bird, irritated by the confinement, may injure his mates by constantly pecking at them. Females, especially hens, which have not been accustomed to each other's society, frequently disagree if placed in the same compartment, and will be safer if separated. Partitions separating males in the same coop should be so strongly built that they cannot, by any possibility, be wholly or partly broken. Cotton cloth is not sufficient for the purpose; it is easily torn by the claws of the birds, if they attempt to reach each other, or if the coop is tipped so that the occupants stand partly upon the partition.

—Coops for Shipping to Shows.—

Substantial, well proportioned coops, of reasonable size for forwarding consignments of breeding stock, offer good accommodations for show birds en route to exhibitions. But as those designed for the latter purpose may be used season after season, one is warranted in building them with greater care and making them more convenient to use. The tops may be cleated, hinged at the back, and fastened with hooks and eyes or with hasps and staples in front; or they may be held in place by four screws, one at each corner. Light pieces of wood, one inch thick and perhaps two inches wide, hollowed on the underside of the lower edge and nailed one to each end, serve well as handles when there is no convenient way to lift the coops.

Height is not only desirable, but necessary. Males forwarded in coops so low that their heads touch the top often arrive with combs raw and bleeding and neck and plumage soiled by the blood. Single combs, particularly those above medium height and those of fine texture, are easily bent out of shape and a little pressure from above, while in the heated express car will turn a good comb out of shape in a few hours' journey.

White birds that have been washed are easily soiled. Dust or soot show doubly plain on pure white plumage. On that account it is we,l to cover all opeoings in the coops with thin cheese cloth, which will keep out dirt without cutting off the supply of air.

Smoothly built, painted show shipping boxes, with the owner's name upon them, make a pleasing appearance and occasionally attract a customer.

— For Long Distance and Foreign Shipments. —

Consignments bound for distant points which must travel for several days, or several weeks, before reaching their destination, must be cooped with special reference to the comfort of the fowls and the convenience of those who care for them en route. While very large coops are neither desirable nor necessary, sufficient room must be allotted each fowl to permit it to move about, to stretch upward to its full reach and to spread its wings. It should be borne in mind that stretching and scarcthing in the litter on the floor of the coop is the only exercise that the fowls can get. If the shipment is to be on the road more than a week, provision must be made for removing the dirt which accumulates under the litter. To satisfy these requirements, and others pertaining to comfort and conveoience, coops constructed of light lumber, or of lumber and heavy cotton cloth, with solid back, top and ends and slatted fronts, are satisfactory. Narrow, horizontal doors, extending across the front of each compartment, next the door, are recommended by several experienced exporters because through them, the caretaker can thoroughly clean the floor with but slight possibility of the fowl making its escape.

— The Provisions for Food and Water. —

Cups for drinking water should be attached to the coops in such a manner that they hang inside out of the way, but can be removed to be cleaned, and can be filled from the outside.

The orthodox manner of forwarding food to be consumed during the journey is in a bag marked with the same shipping directions that are placed upon the coops. Not much fault can be found with that method except that the sack of grain sometimes gets separated from the coops and the fowls have to subsist upon whatever the transportation company has on hand. To avoid such a risk grain boxes can be built into the coops. A capacity of several quarts can be secured by making a shallow box across one end of each coop, directly under the top. That part of the top will serve as a cover for the box and may be hinged and fastened with a hook for convenience. Food carried in that manner is sure to go where the coops go and the weight added and space occupied is of little consequence.

Mixed whole grain, principally corn and wheat, with a liberal allowance of apples, cabbage, mangel, wurzels, or some of each, make a good ration for the fowls in transit. Instructions for feeding, attached to the coops, are followed by the majority of express messengers, unless they are closely pressed by other duties.

When the journey is completed in two days or less, an amount of food sufficient to last until the fowls arrive at their destination may be placed in the bottom of the coops; but the shipper should not fail to provide a thick bed of cut straw, dry leaves or chaff to keep it clean.

For such short distance shipments water is not necessary. Yet it is safe to include a cup, so that water can be given if the consignment is delayed on the way, and the thirst of the birds allayed if the weather is hot.

Whether cooping for short or long distances, the comfort of the fowls shipped should be the chief consideration. Birds well cooped almost invariably arrive safely.

Geese.

The Toulouse goose has been domesticated for many centuries, and it is frequently referred to in ancient writings as the "grey goose." It is the largest bird of its type there is, the males of English strains frequently turning the scales at 25 to 30 lb., the females 21 to 26lb. The most striking feature of the Toulouse is its massive appearance, when viewed sideways, looking almost square. The body is long and deep, and carried low between the legs, the keel or breastbone being exceedingly prominent almost touching the ground; the back and shoulders are broad, the neck long and thick, the former being characterised by a heavy dewlap on the throat. The legs are short, with heavy bone, and orange in colour, while the bill, similar in shade, is strong, forming a uniform curve from the tip to the top of the skull. The back, wings and thighs are a dark steel grey in colour, each feather being laced with a lighter shade, the breast and underparts are of a clear grey, while the stern, paunch, and tail are pure white. The goose is a good layer of large white eggs, but seldom goes broody, and when she does evince the desire to sit is not to be trusted on valuable eggs. The goslings of this breed are very hardy, and require but little attention to rear successfully. They are not quick growers but, considering the large size they ultimately attain, this is but natural. Toulouse geese are heavy eaters, and thus, whenever possible, they should be given access to green feed, where they can largely support themselves. For crossing the Toulouse is especially valuable.

Apart from the question of size, the Embden probably possesses rather finer economic qualities than the Toulouse. The goose are very persistent sitters, and are quiet, reliable mothers; if allowed to follow their own inclination, they sit early in the season; but, in order to prevent this, and so increase the supply of eggs, the eggs should be removed from the nest each day as laid. Embdens are hardy, the goslings grow quickly, and entail little difficulty in rearing; they are excellent foragers, and upon good land can nearly support themselves. In plumage Embden geese are pure white, with orange coloured legs and bills. Their body is long and broad, but lacks the deepness of the Toulouse, having a more compact and tight appearance. The wings are exceedingly large, the neck long and fine, the paunch and stern full, and the legs very strong and stout in bone. The adult gander averages in weight from 24 to 28lb., the geese 22 to 26lb.

Facts About Hen Manure.

"What is the value of hen manure? How much per hen in a year?" The Rural New Yorker replies as follows:—

These questions are asked so many times during the year that we have hunted up some of the records. At the Maine Experiment Station the manure dropped by 180 hens for three nights was collected and weighed. It was found that on the average these 180 hens dropped in three nights 45 pounds or 720 ounces. This would mean about 30 pounds for each hen per year in night droppings alone—not counting the day's dropping. At the New York Station it was figured that the night droppings of each hen for one year averaged about 31 pounds. So far as we know there are no figures showing how much manure is made while the hens are off the roosts The fowls roost less than half the time, and probably drop more while exercising then while quiet. It was concluded therefore at the Maine Station that a hen of average size probably drops about 75 pounds during the year altogether.

The fresh manure at the Maine Station was analyzed and found to contain 2.8 per cent of nitrogen, 1.8 of phosphoric acid and 0.9 of potash. On this basis 100 pounds of the fresh manure—right from the henhouse—would be worth about 65 cents on the basis of what chemicals would cost in a local market. Thus a hen in one year will give not far from 45 cents' worth of plant food in all her droppings, or about 15 cents' worth in that part which is found under the roosts. Five hens will give as much nitrogen in one year as you will find in a ton of ordinary stable manure. This nitrogen, too, is in far more available shape. We can understand from this why a flock of several hundred hens running at large in an orchard make such a showing on the trees. In six months 250 hens would drop all over an orchard, if we take these stat on figures, nearly 4½ tons of fresh manure. This means over 125 pounds nitrogen—or the amaunt expected in nearly 25 tons of stable manure, or 200 pounds nitrate of soda. In addition to this the hens give partial cultivation by scratching and tearing the soil, and also secure a fair share of their food in bugs and grass. We see from this why hens are not popular in peach orchards. The large amount of soluble nitrogen which they drop stimulates too much wood growth on the peach and makes soft and light-colored fruit. To a less degree this is also true of apple trees. Whenever hens are pastured in apple orchards there is a wonderful growth of wood and large fruit of rather light color and soft texture. We know a case this year where part of an old orchard is heavily stocked with poultry, while the remainder in sod. The difference in growth is readily seen. The remedy for this overgrowth is an appliaction of wood ashes or phosphate and potash. We see from the analysis of hen manure that it contains an excess of nitrogen, and the potash and phosphoric acid are needed to "balance" it. The very fact that this form of nitrogen is so available means that a large proportion of it may easily be lost.

At a very convivial dinner a man with a preternaturally solemn face arose, wineglass in hand, to propose a toast.

"May we never," he said, in deep measured tones, "drink any more of this stuff"—he paused, and there was a horrified silence for several seconds —"than is good for is!"

Pigeon Notes.

The Tumbler.

The Tumbler pigeon exists in eat variety throughout the orld, and is everywhere a favour- . It derives its name from an erited capability of turning mersaults in the air. Willough- , the English ornithologist, writ- more than two hundred years o, describes the Tumbler as small and of diverse colours. ey have strange motions, turn- themselves backwards over eir heads, and show like foot- lls in the air.",

The general appearance of the erywhere well-known and, com- on flying and performing Tumb- in Pigeon Keeping for Ama- urs is described as that of a l-breasted, short-legged pigeon eighing from 10 ounces to 12 nces. The head is rounded ra- er than angular; the beak is ort compared with that of the mmon blue or chequered dove- te pigeon; the iris of the eye ght to be of a pearl white, though generally more or less reddish round the outer circumference, while many good performing birds have yellow or gravel eyes, and others hazel, or, in fanciers' language, "bull" eyes. The flight and tail feathers are of medium length, and the legs and feet unfeathered. This type of pigeon is found in infinite variety of colouring, such as all blue, silver, black, dun, red, yellow, and white, also marked in some way or other with white, such as white-flighted or white-tailed, or mottled over the body more or less with white. There are also chequers of various colours, as well as grizzles, the latter having the fibres of the webs of the feathers a mixture of white and colour, such as blue-grizzle and red-grizzle. In short, the variation in colour and marking of the common Tumbler is so extensive that it would not be difficult to select, out of a dealer's stock, in the course of a year, a hundred birds no two of which would be alike. This arises from breeding the best flying and performing birds together regardless of colour. At the same time there were, not long ago, various breeds of Tumblers that could perform well in the air, which have been long bred for colour and marking, such as the Macclesfield Tippler, black, blue, and silver Beards, and Baldpates of various colours. These were good tumbling birds in former days, but I fear that the well-marked Beards, Balds, and Mottles so extensively bred nowadays for the show pen are not, in many cases at least, Tumblers in anything but name. In fact, the majority of them, including the rich-coloured black, red, and yellow self-coloured birds one sees at every pigeon show, are merely "toy" pigeons, some of which have been crossed with non-tumbling breeds to produce good colour.

The tumbling propensity of the Tumbler is inherited, and what causes it to turn over in its flight is not known. Some pure-bred ones never attain to it, and others may be seen trying to turn over, but only getting half way. While young, and before they get proficient, they make many such attempts to turn a complete somersault. One style of tumbling is to give one turn at a time, and that so quickly that the bird does not lose way in its flight. Others come to a stop in their flight, clap their wings, and then make a single, double, or treble somersault. The Roller, again, will come down twenty or thirty feet through the air, rise again, and execute a succession of such performances, when he is entitled to be called a "long" roller. Many good birds have been killed through their inability to stop tumbling till they reached the ground. Now and then a bird is produced from a good stock of Tumblers that is unable to rise a yard from the ground without tumbling. From such birds a breed has been produced called "house," "parlour," or "ground" Tumblers, which tumble when flying about in a small aviary, or which, in some cases, are unable to leave the floor of their loft without tumbling back on the ground.

The Tumbler fancier who is attached to his birds must devote much time and attention to them, as they require special care and training, without which they deteriorate in regard to flying. They must not be allowed unlimited freedom, or they will get into a habit of sitting about chimney tops and roofs, instead of mounting into the clouds. Those also that leave the flight and cause the others to descend must be weeded out. They are generally flown in the morning and then confined for the rest of the day. Those that fly very high, and for some hours at a time, generally tumble only when rising and descending. Of late years the records of some extraordinary Tumbler-flying have been published. At the Nottingham and Leicester summer matches, the winning flights have been on the wing for as long as thirteen hours. The birds that do this, however, are not always pure Tumblers, but Cumulet-bred pigeons.

The Cumulet, or Volant, a bird of extraordinary power of flight, is of French or Flemish origin. It is much the same size as a Tumbler, generally white, or white with red ticked neck, and with a pure white iris, or "fish eye" as it is called.

A variety of Tumbler, not so generally kept as the clean-legged kind just described, is the feather-legged or "muffed" breed, much fancied about Birmingham and the Midlands. These birds are generally longer-beaked and rather larger than the others and with feathered legs and feet varying from grouse-legged to long-muffed, some of them having foot-feathering 4in. in length. Such as are bred for the show pen will be described farther on. Many of these muffed Tumblers, when bred for flying and tumbling regardless

of feather, are described as good performers, affording great enjoyment to the numerous fanciers who keep them.

The Macclesfield Tippler is an old breed of clean-legged Tumbler, and was formerly noted for its rapid tumbling and high flying, generally making single turns in its flight. The colour known as "printed" in this breed is white with dark points, the head, flight, and tail being brownish-black with more or less mottling over the neck and body.

Long-faced Tumblers for the show pen are now very extensively bred, and though not long-faced in comparison with some pigeons are so called to distinguish them from the real short-faced, such as the Almond. The Long-faced Tumbler for the show pen should have all the shape and make of the best type of flying bird, be pearl-eyed, have very little beak and eye-wattle, bit not so short a beak as to appear to have any cross of the real Short-faced, or it becomes what is called "pleasant" faced. In whole or self colour it is shown black, red, yellow, and white, and occasionally blue and silver. Depth of colour, accompanied with metallic lustre on the feather is the desideratum, after correct type, in these birds. The rarest to see good is the red, which seldom carries its colour to the end of the tail.

Mottles and Rosewings are identical with the foregoing except in marking. The Rosewing should have a rose pinion of single white feathers, well separated from each other, on the shoulders of each wing, lying in a round form, or within the compass of a circle the size of a crown piece. The Mottle, in addition to such a rose pinion, should have a V shaped mottling of single, well-separated, white feathers on the back: this is known as a "handkerchief" back, and is rarely seen good. Both these varieties are extremely difficult to breed anything like perfect. In breeding them—and they exist in black, red, and yellow—birds are produced with too much or with no marking. Self colours, mottle-bred, are, however, useful to breed from. It is evident that the standard of perfection in Mottles and Rosewings is one peculiarly open to fraudulent practices in the way of clipping out fou, feathers. Whole-coloured birds have won prizes as Rosewings, the mottling having been added by cutting off some feathers near the skin and inserting white feathers into their shafts. A few white Rosewings have been lately produced; these are white with a rose pinion of black feathers.

The Whiteside Tumbler exists in red and yellow, and ought to be all coloured except on the shoulders, being in marking the reverse of the Turbit pigeon. These birds do not come out of the nest so marked, but asnume the white shoulders during their first moult. They are apt to fail in strength of colour in flights, tail, and on the lower parts of the body.

The Almond Tumbler (Long-faced) is sometimes found very good in colour with the rich yellow ground so desirable in the Short-faced Almond. Good flying and tumbling Almonds fortmerly existed.

The Baldhead or Baldpate Tumbler exists in black, blue, silver, red and yellow. The marking that looks best is when the white runs in a straight line about ½in. below the eye. The flights ought to be white to the turn, or "ten and ten a side" as it is called: the rump and tail with its coverts should be white and the whole of the underbody the same. The line of demarcation below the breast is called the "belt," and ought to be in a straight line. Pearl eyes are requisite in Baldheads for exhibition; but in breeding them odd-eyed and bull-eyed birds are often produced. The best birds are blues and blacks, very few really good coloured reds and yellows being in existence. Good tumbling and high-flying Baldheads once existed, and beautiful they looked on the wing, their white points telling well as they wheeled in their flight. They are serviceable feeders for Short-faced Tumblers.

Beard Tumblers are also found in all the chief colours, and pretty birds they are when well marked. They derive their name from a dash of white under the beak extending from eye to eye. The upper mandible should be coloured and the lower one white; the eyes should be pearl-white and not dull or dusky; the tail, with its coverts, and the ten primary flights of each wing should be white and the rest of the plumage coloured; but the feathers on the lower part of the thighs adjoining the hocks are generally more or less white. The black, blue, and silver Beards of thirty years ago could fly and tumble well, but most of those exhibited now are mere toys bred for the show pen.

Muffed Tumblers exist in whole-feathered black, white, red, yellow, blue, silver, and chequered; and also in Mottles and Rosewings. The feathers on their legs and feet should be as long as possible, and appear like small wings. What are called Saddles and Badges have probably the same origin, but the marking differs. The Saddle, found mostly in blue and black, was said formerly to be a muff-legged Tumbler marked exactly the same as a Magpie Pigeon, but the present standard is that of the Magpie with some white marking about the head as follows: a white snip or narrow line from the beak-wattle to the forehead about ½in. long, a white spot or narrow line about ¼in. long over each eye, and an extensive white beard under the beak from eve to eye on which two coloured spots, called "Whiskers," extend from the wicks of the mouth downwards and backwards. Badges also have these head-markings, but, with the exception of white primary flights and white leg and foot feathering, from the hocks downward, are all coloured. Saddles and Badges are rarely seen well marked, and are not much fancied outside of the Midlands. Their breeders are not yet unanimous as to what constitutes correct head-markings.

Feather plucking is frequently due to the birds being over-heated, owing to their food not having been regulated, or to irritation of the skin caused by insects, or a want of aperient medicine.

"The next time you spill your coffee on the tablecloth, don.t try to hide it by setting your cut on it. I will notice it anyhow when I clean it up."

"Yes, but I am in the office by that time."

Home Notes.

The Middle-Aged Woman.

At what age is the spinster super-annuated? And when may a woman be regarded as middle-aged?

It depends on the individual woman and her will power.

The readiest method whereby a woman manufactures herself into a superannuated spinster is to allow people to give her the impression that because she is not married at thirty she is necessarily a "has been."

The woman who remains at home still at her mother's apron-strings after reaching maturity is almost bound to wither early on the parent stem. Average mothers are apt to subject their grown-up daughters to the discipline and regime of the nursery. And the process is terribly ageing.

Suppression, and the chronic subjection of her will to that of another woman takes the spirit, spunkiness, and youth out of the grown-up daughter.

Some family circles are not sparing in their cynical reminders that one of their number is getting on in years. Younger sisters "coming on" impress on their elder Elizabeth, who is still remarkably handsome, the necessity that she should take a social back seat.

"You must give the girls a chance," urges the mother.

Elizabeth's spirit of coquetry is chilled by the cynical attitude of her more youthful sisters, to whom a woman of thirty is synonymous with an old frump. Because she has not married, her family regard her as a failure. To live in an atmosphere of failure, regarded as an old maid whom no man has wanted in the past, or woos in the present, is about the most ageing influence there is.

If the eldest of several grown-up daughters dresses her hair in a new and becoming manner sundry hints drop that she is setting her cap at somebody, or trying to look young. Unless she has the courage to face the music she subsidies into the sad and depressing role her relations have so industriously prepared for her.

Camemberti Cheese.

A corespondent writing in "Lee Fermier" says that the well-known Camemberti cheese is made as follows:—The milk used for making the above cheese should be creamed slightly, because if all the fat is left in the milk the cheese would be too fat; indeed, a good plan is to cream the evening's milk next morning, and then add to it the morning's new milk, which will thus give the cheese a proper consistency.

— To Curd. —

Put the milk into vessels that will hold the heat some time. Mix about a spoonful of rennet to eleven gallons of milk at a temperature of from 78 deg. to 80 deg. The curd should form slowly, but not be too prolonged, otherwise the cream will separate from the milk, and the cheese will not be well mixed. This process should take from four to five hours.

— Putting into Moulds. —

When the curd is well formed—and to ascertain this fact put the fingers into the mixture, and if it is formed it will not stick, and will separate easily from the whey. The mixture must now be put into cylindrical moulds, with holes pierced in them for the purpose of drainage. Fill the moulds by four or five spoonfuls at a time until they are full. Each mould will hold about three pints. Lay carefully upon rush mats, or grooved slabs, to drain. The temperature must be kept exactly at 64 deg.

— Salting. —

In the evening on the day after the cheese has been put into the moulds turn them over. Two days after they are ready for salting. Spread the salt over both sides of the cheese as evenly as possible. At this period each cheese should weigh nearly one pound.

— Drying-rooms. —

The drying-rooms should be large and well ventilated, and kept at a uniform temperature of 59 deg. Windows should be small but numerous, and covered with fine netting to keep out the insects. As a rule, the cheese is now laid upon straw wattles in rows, and not touching each other; turn them every day at first, and then every two days, and by degrees the small, whitish, yellowish spots will begin to appear on the surface, until it is covered. It is very important to follow the development of these spots, as they have a marked influence upon the quality of the cheese. If the cheeses are defective the wattles must be cleansed in hot water, or fresh ones substituted.

— Refining. —

The cheese remains, according to circumstances, from twelve to twenty-five days in the drying-room to harden and dry. When they are of such a consistency that they do not leave marks when pressed by the fingers, and when they begin to sweat, they are ready for transferring to the cellar to ripen; there they soften and acquire that taste and mellowness so essential to a first-quality article. This large chamber is often partly built underground, so that the temperature may be kept even and the atmosphere humid. Shutters must be over the windows whilst the sun in shining, otherwise the variation of the heat will be injurious to the cheese, and the temperature should be kept at 57 deg.

Place the cheese in rows according to age upon the shelves and carefully look after them. They require to be often turned, any moisture that may be noticed upon them to be removed, and all damaged cheeses taken away.

The time necessary for making this kind of cheese varies a little according to circumstances; but, as a rule, it takes from forty-five to fifty days from the time they are put to curd until they are ready for sale.

Patient: I wish to consult you with regard to my utter loss of memory.
Doctor: Ah, yes! Why—er—in cases of this nature, I always require my fee in advance.

Household Hints.

If the upper inside edge of the pan is well greased with butter, chocolate, milk, cocoa, or anything of the kind will never boil over.

Physicians assert that baked potatoes are more nutritious than those cooked in any other way and that fried ones are the most difficult to digest.

— To Clean Flatirons. —

Sprikle fine salt upon a flat surface, and rub your hot flatirons over it whenever the irons become rough and stick to the fabric.

— Vegetable Stains on Fingers. —

To remove stains of fruit or vegetables from the fingers, rub the stained parts with a piece of lemon.

— Bright Tumblers. —

Tumblers that have contained milk should never be washed in hot water, as it clouds the glass permanently.

— To Soften the Skin. —

A level teaspoonful of boracic acid dissolved in a pint of freshly-boiled water and applied cool is the best wash for inflamed sore eyes.

— Ivory. —

Ivory, if carefully washed with soap and a soft brush, dried in the sunshine, and then washed again, will, unless it be very old, soon regain most of its original whiteness.

— To Soften the Skin. —

If the fingers are hardened by much needlework, a little vaseline rubbed in at night will soften them again, and smooth any rough places.

— Dark Marks on the Neck. —

To remove dark marks from the neck, dab with lemon juice; but if the neck is washed daily with hot water and soap it should not need this treatment.

— A Test for Tinned Meats. —

Before opening the tin see that the top is flat or depressed. If this is the case, no air has entered the tin since it was soldered down. If the top is bulged out, the contents may be putrid and unfit to eat.

— The Hair Brush. —

Do not use a wire brush for the hair, but one with long bristles of medium thickness, which will not tear out the hair unnecessarily, though thoroughly removing all dust and dandruff.

— Soap Them. —

When a bureau drawer sticks and refuses to pull out comfortably, take it out and rub common yellow soap freely on the lower edges, on the pieces on which it slides and on the wide front piece. Return the drawer to its place, pull it back and forth a few times, and you will have no further trouble.

— Kitchen Walls. —

Painted walls are best for a kitchen, and they should be finished with a coat of enamel paint. Then they can be washed without injury. The best way to do this is by using a large carriage sponge fitted to a long-handled mop-holder.

— To Mend Glassware. —

If you happen to break a glass or valuable glass ornament, it can be effectually and easily mended in the following way: Melt a little isinglass in spirits of wine, add a small quantity of water; warm the mixture gently over a moderate fire. When mixed by thoroughly melting it will form a perfectly transparent glue, which will unite glass so nicely and firmly that the joint will scarcely be noticed by the most critical eye.

— To Keep Bread. —

To keep the bread in a nice condition, take a fair-sized potato, wash it, and place in the pan where the bread is kept. Moisture is often given off by this vegetable, which prevents the bread from getting dry, and yet there is not sufficient moisture to cause any mildew. The bread-pan should be washed out weekly, and thoroughly aired. The lid should be kept a little open, so that the air may circulate freely. If these little hints are followed, the bread will always be in nice condition.

— Preserving. —

When preserving fruit always place a silver knife, fork, or table spoon in the jar and pour in the boiling fruit. A teaspoon is a convenient size for jelly glasses. Simply have your jars clean—no heating, scalding, wet towel or anything of the kind in necessary. Set the jars in a row, and as one is filled remove the piece of silver placing it in the next one to be filled, and so on.

— Vaseline Stains. —

To remove vaseline stains, have ready a moderately hot iron and four pieces of blotting paper on a board, wet the spot thoroughly with benzine, lay on the blotting paper, cover with the two other pieces and press quickly with the iron. If the stain is very firmly set, a second or even a third application may be necessary. Remember that benzine is very inflammable, and should not be used in any room containing a fire or lights of any kind.

Some Useful Recipes.

— Rich Seed Cake. —

Time one hour ½lb. of butter, ½lb. of sugar, 1lb. of self-raising flour, 6 eggs, and some carraway seeds. Beat ½lb. of butter before the fire to a cream, then stir in the pounded sugar and beat together for some minutes; add the yolks of six and the whites of three eggs, one at a time; then stir in gradually 1lb. of self-raising flour, and a few carraway seeds to taste. Bake it in a tin lined with buttered paper in a moderate oven.

— Farmer's Pudding. —

Two cupfuls of breadcrumbs, soaked in a cupful of milk; half a cupful of molasses, half a cupful of chopped suet, one egg, one cupful of raisins, half a teaspoonful of soda dissolved in a little water, a pinch of salt and cloves, cinnamon and nutmeg to taste. A spoonful of cinnamon to half of one of cloves, and the same of grated nutmeg will be an average quantity. Boil two hours in a pudding mould, and serve with vanilla or foaming sauce; or cover and bake in a slow oven, removing the cover to brown the surface.

— Oatmeal Scones. —

When making scones, the chief point to remember is that they should be rolled as little as possible; over rolling makes them of a totally wrong consistency, making them resemble puff pastry. One pound of fine oatmeal, 3oz. butter, salt, ½oz. baking powder, one egg, a little milk. Mix together the oatmeal, baking powder, and a quarter of a teaspoonful of salt. Next rub in the butter; beat up one egg, add it to the other ingredients, with enough milk to make a light dough. Roll it out on a floured board, shape it into rounds about three-quarters of an inch thick, put them in a greased baking tin, and bake in a quick oven from 25 to 30 minutes.

— Lemon Syrup. —

Three large lemons, 3lb. of sugar [illegible] fastcupfuls of cold water, [illegible] of citric acid. Pare the rind of the lemons, put it in a pan with the water, and boil a quarter of an hour with the lid on. Strain. Boil gently with the sugar and acid for five minutes. When cold bottle for use.

— Simple way to Jug Hare. —

Cut into shapely pieces a hare ready dressed for roasting, season it with pepper, allspice, pounded mace, and grated nutmeg, put all into a brown earthern jar with an onion, two cloves, a bunch of sweet herbs, half a pound of gravy beef, and one ounce of butter, tie the jar down with bladder. Set the vessel in a pot of water up to the neck, but no higher, keep the water boiling for four hours. When ready, dish the hare, add a wineglass of port wine to the gravy, thicken it with a lump of butter rolled well in flour, give it one boil, then pour it over the meat; send to table with a glass of black currant jelly and a dish of half lemons. When you have more jugged hare than can be used at one meal, the remains can be made into a tasty pie.

— Scotch Cakes for Dessert. —

Take six ounces of flour, six ounces of butter, six ounces of sugar, half an ounce of ground ginger, and enough beaten eggs to make it into a paste. Rub the butter in the flour, add the sugar and ginger, make it into a paste with the beaten egg, roll out very thin, cut into biscuits with a round cutter, prick them with a fork, and bake upon buttered paper laid upon a tin, in a moderately-heated oven. These may also be flavoured with lemon, cinnamon or caraway seeds.

— Roast Turkey. —

For baking a large, stuffed turkey four hours is none too long. One mistake frequently made by the inexperienced is in not allowing sufficient time for this, and nothing is more annoying than to find the fowl underdone at the dinner hour. Better allow half an hour extra for the baking rather than take any risk on this point, as over cooking is no particular disadvantage. If left uncovered in the oven a roasted fowl will not be injured in the least.

— Savoury Pudding.

Chop finely three ounces of onions and two ounces or less of green sage leaves. Put them in a pan with a small quantity of water and simmer gently until the onion is tender. Take off the fire, add plenty of bread crumbs, and mix in sufficient dripping to make the whole combine, but beware of using too much fat. Season the mass well with pepper and salt and bake in greased pie dish in a moderate oven. Good with roast pork.

—Very Digestible Plum Pudding—

Soak 9oz of stale bread in milk for twelve hours then squeeze it dry; add half a pound of stoned raisins, four ounces of beef suet, chopped fine, three eggs, three ounces of sugar, and a little nutmeg. Butter a mould, put the pudding in, and boil it for three hours without ceasing, filling up the pot with boiling water from time to time is required. Serve with wine sauce.

Candied Lemon and Citrus Peel.

The process entails some trouble, but is simple enough. The following is a plan adopted in a large colonial confectionery establishment :—

The fruit must be neither too green nor too ripe, and the peel must be carefully handled. With lemons, cut them in half, and squeeze out the juice, which can be used for various purposes. Citrons should be cut into quarters, and put into a strong brine of salt and water, and left for about one month, or until the pulp separates readily from the peel. The peel must not be left in too long, or it will become soddened, or soft. After taking out the pulp, being careful not to break the skin, place the peels in fresh water, changing same daily until the taste of the salt has gone. This should be in about three days. Squeeze out as much water as possible, then place the peel in clean cold water, boil gently for a minute or so to soften, allow it to cool, and then place the peel on something to drain, afterwards squeezing out the water. After this it is boiled in a strong syrup, about 8 lb. sugar to a gallon of water, for about an hour, and when cool it put into a cask or vat with the syrup. At this stage it is called "green peel." and will keep for a long time. If drained peel is required remove it from the syrup, drain on wire racks, and dry. To candy the peel is a somewhat delicate process, requiring experience. Boil the sugar by itself, immerse the drained peel in the boiling liquid for two or three minutes or until the sugar has covered it all over, leaving a little in the hollow. When finished, the peel should be transparent and taste of the acid of the fruit as well as of sugar. Candy peel of orange or lemon can be readily made for household purposes in the following way :—

Cut the fruit in quarters, remove the pulp, put the peel into salt water for 24 hours, and then drain. Make syrup of 1lb. sugar to each pint of water and skim it, put in the peel, bring up to the boil, and stand it aside for twenty four hours; then drain away the syrup, place the peel on a large dish in the sun or in an oven for a few hours to dry a little. Boil the syrup again for 15 minutes, add the peels, and stand away overnight. Repeat this process daily until the peels are clear and the sugar has penetrated them thoroughly, then drain, sift thickly with powdered sugar, and dry in the sun or oven.

How to Keep Meat Fresh.

A valuable hint to those who have occasion to keep fresh meat on hand, especially those moderate-sized families who kill their own sheep. First, have the sheep killed in the evening if possible, as it does not set so well if killed in the morning. Hang in a shady place where the breeze can get access to it, and enclose in a calico bag. Then wet two thick grain sacks (not chaffbags). Draw one on and tie it securely with a thick cord or piece of rope, which is easier than a thin string to manage. Then do likewise with the second grain sack. The sacks must be thoroughly soaked before putting on. If the weather is very hot you must remove the outer sack through the day and re-soak it as often as it gets dry, which may be once or twice in the very hot days. The inner one will not dry if the outer one is kept wet, and it will prevent exchange of air, which tends to putrefy. The idea is to keep these two sacks quite damp, which is a very easy matter, and the meat will keep fresh quite a long time, just as though freshly killed. In fact, I have kept mutton nearly a fortnight, even in the hottest part of the season, by following this simple, inexpensive plan. If by long keeping it should get a little mouldy, the spots of mould can readily be removed by a cloth dipped in vinegar. It is only in very hot weather, when kept a very long time, it is likely to get mouldy, for in ordinary temperatures it is wonderful how beautifully fresh it keeps without losing weight or getting that dried-up surface which is invaitable when kept in the ordinary way. Before trying this plan I lost a good deal of mutton, but since adopting it I haven't lost a pound. The point to remember is: the bags (two sacks) must be kept wet—not the inner one of calico, of course. The principle is much similar to the famous canvas cool safe. The air inside the bags is kept sold all the time by evaporation —N.Z. Farm, Stock, and Station Journal.

A small piece of meat may be made to go much further if stewed instead of broiled, and it will also yield all the nourishment the meat affords.

Nicely baked potatoes have their starch grains more thoroughly cooked than when either boiled or steamed, and for this reason may often be safely eaten by delicate invalids who cannot touch them boiled.

Mr. Frank A. McNeil called on us one day recently, and expressed himself with some vigor as to the professional standing and general mental make-up of our printers. Upon enquiry we found that the cause of offence was the omission of a couple of letters from his advertisement in our last issue. They certainly were rather important items in the word from which they had, unfortunately, been dropped. As it stands "Sikest" does not go far enough in expressing the "Slickness" which Mr. McNeil claims is a special feature of his photography. It will be recognised that to call the slickest photographer in the State sikest was not the best way to make a friend of him. Mr. McNeil, however, was good enough to accept our apologies, and to promise that next time we go to him to have our photo taken he will not take the revenge which would be so easily possible, but exercise to the full the undoubted skill which has created for him an enviable reputation as one of the most successful and progressive photographers in Adelaide.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide Telephone, 1284.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

Garden Notes for January.

The following seeds may be sown now in the warm early districts :—Pansies, cineraria, primula, petunia, stock, delphinium, primroses, polyanthus, phlox, balsam, etc.

The following seedlings are suitable for present planting :—Gaillardia, sunflowers, French and African marigolds, phlox, delphiniums, petunia, calliopsis, hunnemannia, aster, cosmos, ornamental capsicum, amaranthus, salipglossis, etc.

Plant new lawns of couch or buffalo grass, renovate bare spots, give regular attention to mowing as well as the watering, and a periodical application of liquid sulphate of ammonia.

Keep the surface of beds not mulched well broken up with the hoe. Where possible, mulch all annuals.

When the delphiniums have finished flowering cut them back to the ground and a second crop will be the result.

Remove old and faded blooms from roses, cannas, pelargoniums, dahlias, etc., and add them to the compost heap.

Keep paths and beds free from weeds, which can be used as mulch.

Give liquid manure once or twice a week to such plants as the Penstemon, zonale pelargonium, fuchsia, dahlias, cannas, phlox, etc. This enriches the colors and enlarges the bloom, but must only be given after a watering with clear water.

Plant out shrubs from pots on cool days. Disturb the roots as little as possible, but the "crock and drainage" must be removed before planting. Give a good watering and mulch to ensure success.

Budding of roses may be proceeded with. It is advisable to put two or three buds on each stock, as the rose will make a bigger head in a quicker time by this method.

Keep hedges clipped to induce them to branch, and thus make a thicker and greener wall. Hedge plants, like everything else in the vegetable kingdom, require food. Give stable manure or supherphosphate.

Asters are showing their flower buds, and require liquid manure, nor must they suffer from a suspicion of drought.

The sunflowers, especially the taller-growing kinds, such as the "Silver-leaved," will be better if staked with a bamboo or a split paling; their roots have not a very firm grip of the ground, and are often blown over by the wind.

The zinnia and caliopsis beds are beginning their period of beauty, which can be prolonged by a weekly application of manure water and a hoeing of the surface of the bed once a week.

Annuals that are finished flowering should be pulled up at once and added to the compost heap. Remove the old flowers of the verbenas and zonale pelargoniums, and pinch back the growing point occasionally.

Cuttings of evergreen shrubs, carnations, Pelargoniums (show, regal, fancy, and zonale), verbenas, petunias, etc., if planted in a soil containing a large proportion of sand will strike easily at this time of the year. Keep damp, but not wet.

Seedlings of autumn flowering annuals can still be planted out, selecting a cool, cloudy day for the purpose. A little shade for the first day or so is advisable. A twig of laurustinus, carob, gum trees, or other evergreen placed on the north side answers admirably.

Annuals require constant attention as to watering, their roots being so near the surface are easily affected by heat and drought. A mulch of some sort is almost indispensable for them.

The regal and show pelargoniums, after making a brave show, will soon finish now, but the zonale or geranium, as it is commonly called, will bloom for several months yet. Keep them supplied with water, remove old flowers, and nip back the growing points, so as to prevent them becoming straggley. Give liquid manure.

— Mina Lobata. —

That pretty annual creeper, the Mina Lobata, forms a very pretty object in the garden during the autumn, but there is sometimes a difficulty in knowing where to plant it, as the fences, etc., are usually occupied with perennials. The following forms a neat and easy way of overcoming the difficulty. Procure four stout bamboos, nine or ten feet long, and tie the smaller ends of three of them together with a piece of copper wire. These shoved into the ground two or three feet apart form a light tripod, and the fourth bamboo placed in the centre of the base and tied to the others at the top will tend to steady it. A piece of twine tied to one of the stakes and then wound round the whole to the top will bind it together and give it a stability which is not always attained even when much heavier materials are used.

(Continued on page 340).

Triumph of the Sweet Pea.

The year 1912 will probably be known in the floral history of the State as that of the coming of the Sweet Pea.

It has of course been grown abundantly for years, but it had not up to this season attained its present position of the most popular flower of springtime. In England also its progress was slow till the coming of the Spencer type, since then its record has been one of almost unexampled progress. To no other flower has it been given to attract forty thousand entries for a thousand pound prize.

Discussing the triumph of the sweet pea, a writer in "The Nation" makes the following interesting comments on the early history and ultimate success of this charming flower :—

Professional florists are well accustomed to the rise and fall of flowers. They have seen the zonal geranium reigning as a queen while the daffodil grew unnoticed in cottage gardens. They have seen the geranium decline and the daffodil rise to dizzy heights of favour—and the substantial price of £50 per bulb. They have seen cactus dahlias ascend and verbenas descend. But even they, with all their experience of the fluctuations in favour which alternately raise and depress flowers, have been astonished at the rapid rise of the sweet pea. A few years ago this was a little flower of three or four colours, which people grew for its fragrance, as they grew mignonette, and sweet Sultan, and stocks. It now has two or three hundred varieties, a special society all to itself, and great exhibitions in different parts of the country. Twenty years ago one might as reasonably have expected to see a flower show made up of snapdragons as one composed of sweet peas ; but a July day last year saw the Royal Horticultural Hall, at Vincent-spare, crowded with people, who had gathered from all parts of the United Kingdom, as well as from America, to see an exhibition of this now popular flower.

The remarkable point is that the most learned florist in the whole world of horticulture cannot tell you exactly how it has come about. For nearly 150 years the sweet pea stood practically still. During the next half-century fresh varieties now and then appeared, but then they suddenly began to pour out in dozens, in scores, in hundreds, and now never a year passes but thirty or forty fresh sorts appear. They are not all distinct, but it is an interesting fact that the most beautiful variations among sweet peas occurred after the great flow had been running some time, and not at the beginning of it. So wonderful are some of the new forms that the astonished florists are asking themselves whether finality has been reached even now, or whether this amazing flower has not further surprises in store.

What is the cause of this strange fecundity ? It has to be remembered that the sweet pea is a comparatively old flower in this country (England). The first authentic record of its introduction to England relates to 1699, in which a monk named Cupani sent seeds from Sicily to a Dr. Uvedale, at Enfield. The plant raised from them had a purple, perfumed flower, and a Dutch botanical publication staggeringly described it as Lathyrus distoplatyphyllus, hersutus mollis et odorus. Thus burdened, it is not surprising that some thirty years elapsed before a seedsman had the temerity to include it in his list. At the end of fifty years there were three forms —a white, a variegated, and the original purple ; after another fifty years a black and a scarlet had been added. Thus 100 years had only produced four varieties.

In the first seventy years of the second century, things moved a little quicker, but not very much. A striped sweet pea appeared, and then a so-called yellow. (In passing, it may be noted that florists have been raising "yellow" sweet peas even since, the main drawback to the enjoyment of which is that they are not yellow. Presently came a variety with blue in it, but it was not wholly, or even mainly, blue : it was a white variety with a blue margin. Then came a pink, then a violet, then a carmine. But it was not until 1870, nearly 200 years after the introduction of the Lathyrus distoplatyphyllus, etc., that the real move began. In that year an obscure gardener named Eckford took five varieties of sweet peas and set to work at improving them. It was a momentous step for flower-lovers. Eckford "struck a vein" almost at once, and season after season for over thirty years he sent out a stream of beautiful varieties. The new floral magician did not merely create fresh colours ; he doubled the size of the flowers. He gave us lovely blue, rose, pink, lavender, mauve, purple, bronze, cerise, carmine, flaked, violet, scarlet, lemon, crimson, and salmon varieties, and he gave us blossoms of finer form and greater substance than we had ever seen before. These were of the type known as grandiflora.

This was good, but there was more to come. Nature might have been watching the patient labours of Eckford, and slowly maturing a resolve to outdo them, for she suddenly played a dramatic floral coup in the production of a sweet pea of entirely novel shape, which she produced in two gardens about the same time—the first that of Earl Spencer, at Althorp Park, Northampton ; the second a market garden near Cambridge. It was a happy dispensation on her part to offer one of her gifts to a member of the nobility and the other to a struggling professional. The "Countess Spencer" sweet pea had a waved or frilled flower ; that was its peculiarity. But its colour—a brilliant pink—was very beautiful.

The floral world rose en masse, and demanded seed of the frilled sweet pea with pink flowers at any cost. But it did not get it. Instead it got frilled sweet peas of all sorts of colors, and a good many that were not frilled at all. Buffetings of unhappy seedsmen ! Meetings of committees ! Fierce controversies in horticultural papers ! The "Countess Spencer" had "flattered only to deceive." It was what cross-fertilisers term "unfixed"—that is, was freakish and sportive, refusing to settle down and produce flowers of the proper character. Even now, although florists have been struggling with it desperately for six years, it is a variety of many moods, full of charming, but most exasperating, uncertainty, adorable to the uttermost degree when soberly producing its lovely flower of the

true frilled shape and of the true pink colour, but unreliable. Never was floral fair so fickle as "Countess Spencer."

Again we ask: "How has it come about? What is the cause? Botanists have said that the sweet pea cannot be cross-fertilised by bees as other flowers are, because the organs are shut up in the close segments until the time for pollination has passed. The fact that it stood still for 150 years lends colour to this. Has the ingenious bee been thinking over the problem during many generations and learned how to get in at last, for instance, by splitting the calyx? Or has the change been effected by a small insect, crawling from flower to flower? We lean to the latter view.

The above was evidently written three or four years ago. Since then the "Spencer" type has settled down and there are now scores of varieties which are thoroughly fixed and which come practically true every time.

Seasand and Seaweed.

— Its Use in the Garden. —

The use of these two very common substances, and their great value, is not perhaps generally known. Seasand is a commodity which may be obtained almost at a gift anywhere along the sea coast. The greatest use of seasand is to help to break up the soil, this being accomplished by the little particles of sand getting into the soil and making it more porous and drainable. Seasand is especially useful as a top-dressing to Asparagus and other plants which like salt. It is sometimes advised by gardening papers to put the sand in water to take out the salt, but this takes away from its value, for the small quantity of salt in the sand proves very beneficial to the soil. Seasand may be put on as a top-dressing in autumn or in spring and lightly dug in a month or two after.

Seaweed is a very important fertiliser, especially to those which require a large quantity of potash. The farmers spread it on the fields and meadows, and the rich quality of the grass testifies to its excellence. Potatoes are greatly benefited by its use. Seaweed should be spread on the land in autumn and dug or ploughed in, in spring. For gardens the smaller sorts are best as they decompose much sooner. One way of using seaweed, which I have tried myself, is as follows:—Get a large old iron pot, fill it full of small seaweed, and heat the contents in a fire out of doors until the seaweed inside is a black charred mass. Grind it up into a powder and store until wanted. This powder contains most of the essential parts of a good fertiliser and may be applied as a top-dressing, mixed with soot.—S. H. in "Gardening World."

Watering.

Though to the novice and some young gardeners the matter of watering may seem quite a simple operation, yet the man of experience knows that it is one of the first and most important points in the successful cultivation, especially in the case of all classes of plants grown under glass.

A good waterer must be a close observer of the soil he is handling and the special requirements of the plants under his care. He must know just when his plants require water and how and when to apply it.

Soils of a heavy and retentive nature naturally require less fresandy nature, not that the plants quent waterings than those of a will absorb more water from the one than the other, but from the fact that the lighter soils do not hold so much water as those of a heavier character, and that the water they do hold evaporates more quickly. In dull days the evaporation is naturally slower and the plant itself requires less moisture. It is the action of sunlight upon the foliage that enables the plant to draw the moisture up through its roots, hence in the dull, short days, with but a limited amount of sunshine, a corresponding amount of moisture only is necessary for the support of the plant.

It is easily to be seen, therefore, that the applications of too much water under these conditions will prove hurtful to the plants, not that they will take up more water than they can use, but that the soil will get overcharged with moisture and so turn sour, and, furthermore, under these conditions, less air can get to the roots, and the plants will become inactive and their leaves turn yellow and sickly.

Then when the sunshine strikes on the plants they will begin to flag just as if they were suffering from lack of moisture. It is better to err on the dry side than the wet during the winter months.

The best way is to give the pots a good sharp rap with the knuckles or a little mallet made in the shape of a T, then, if the pot rings, it requires water, but not otherwise. Another mistake in watering is often made by applying just a little water when the weather is not so bright.

This dribbling is worse than no water at all; it never reaches the roots of the plants to do them any good, and so hardens the top soil that it stops capillary attraction, and robs the plants of the support they would naturally get from underground moisture.

The best and safest way is to wait until the soil is dry, and then give sufficient water to reach the roots, letting it dry again before applying more, so that the air may get through to the roots, as without air plants will not thrive.

A careful and discriminating waterer generally turns out a good grower.

(Continued from page 337).

— The Cotton Palm. —

The "cotton" palm makes a singularly beautiful and appropriate object planted in the centre of a large lawn. They may be planted out now from pots, or, if from the ground, a good bole of earth must be taken with each. It is a mistake to transplant too large a specimen, as although very often they do well, there is a greater risk than in planting a smaller one. These palms attain a considerable size, and it is therefore a mistake to plant them in small gardens, for though at first they look well, when older they take all available room and prevent anything else being grown.

— Sturt's Pea. —

Seeds of the Sturt's pea (Clianthus Damperi! can be put in now. These are best planted in the spot where they are to bloom, as when raised in pots the injury to the roots when transplanting is very often fatal to them. They like a very sandy soil, and not a too abundant supply of water; but this must not be misconstrued into giving them none. A pretty effect is obtained by erecting a low trellis 2 or 3 feet high and training the pea over it. One advantage in growing it this way is that the main stem can be better protected from slugs, who often destroy splendid plants in the zenith of the beauty by eating the bark off the main stem just above the ground. A little lime sprinkled round every two or three days is the best protection.

— Pansies. —

Pansies may be raised from seed planted in December, January, and February. They dislike the heat and hot winds of our summer; but plants raised now give months of bloom in the cool season. Sow in boxes or pans in a good loam, and cover to the depth of a penny. Keep the surface always damp with a fine-rosed can. Prick out into another box filled with a rich soil, placing the seedlings 3 ins. apart. Leave them in this until 2 ins. high, when they can be planted out into beds: well manure with cow dung. Distance between the plants, 12 ins. This seems too much room when the little plants are first planted out, but is none too much for the full-grown specimen. Keep the beds watered and hoed, and you will have them blooming in the first weeks of April. Liquid manure can be given as soon as the first flower buds can be seen.

— Petunias. —

Sowings of the petunia may also be made now. The seed is very fine, and care should be taken to sow it thinly, and not to cover it too deeply. Prick out the seedlings as soon as they are large enough to handle. They are most effective when planted in beds or masses by themselves. The best of those raised can be afterwards propagated by cuttings. They are easy of culture and will thrive in an ordinary garden loam, doing best, of course, if it be enriched with manure. They are such free flowerers that they often require cutting back to give the plant a well-needed and well-deserved rest.

— Ranunculus. —

These are delightfully easy to raise from seeds, and plants so raised will bloom a few months after sowing the seed. Fill a box or pan nearly full with a compost of loam and leaf mould, taking care that the box be well drained. To be able to sow the seed thinly, mix it with some fine soil, rubbing the seed and soil well together till the seeds are separated from each other. Sow this mixture, press it down, level, and cover with some more fine loam. Whenever the soil appears dry give a watering with a fine rosed can, and in strong sunshine place a shade over the pan until the seedlings are up.

Owing to the marvellous variety of color in this plant, it becomes one of the very best things for bedding out purposes, making beautiful kaleidoscopic effects in the early spring.

— Garden Paths. —

The tar-paving of the paths in a home garden is the simplest of operations, and can be done by any ordinary laborer. Watch the men doing the tram-lines, the suburban footpaths, or the street crossings, and "Go, and do thou likewise." The operation is as follows, and the hotter the weather the more suitable it is for the work:—First you want a smooth, firm path, which can be swept clean of dust. If you have not got this, make it by breaking up the surface, raking, watering, and rolling until it is smooth and hard. Then keep off it until it is dry. When it is dry, sweep off the dust and apply tar from a watering pot or other vessel, and sweep it with a bass broom until the surface is well covered. Have a supply of dry sand and spread a coating over the tar until no tar is to be seen. Allow it to dry in, and then sweep off the surplus sand, say, in a week, and the operation is done. It will, however, be better to give another coat in the same way in two months; or, failing that, early next summer.

— The Auricula. —

The Auricula is a little difficult to do well but with care they do succeed either under shelter, or if the grower prepares for them a selected spot facing south, open and breezy, and shaded from mid-day sun in summer. There need be no elaborate preparation of the soil, but a deep, well-drained, sandy loam is absolutely needful. If the plantation is to be a large one it will be desirable to raise a stock of plants from seed, and then the question arises how to obtain it. Bought seed is not very reliable unless it is quite fresh. If the grower decides to begin this way, he should get the best seeds procurable and sow in pans filled with fine sandy loam, and keep them in frames, always moist, until the plants appear, bearing in mind that he will have to wait for them a considerable time. When the seedling plants are large enough to handle, carefully transplant them into pans or boxes, or into a bed in a frame. Always give plenty of air, the use of a frame being advisable, because ensuring the plants more attention than they might obtain if planted out in the open border in a very

small state. When the stock has increased sufficiently, plant out. It is well to remember that drought is death to the Auricula, and that damp in winter is only a little less injurious. From the time the first blooms of the seedling plants appear a severe selection must be made. Instantly upon a bad flower opening pull out the plant and destroy it. By persevering in this course, and saving and sowing seed every year, a fine strain of border Auriculas will be secured, and a border 20 feet or 30 feet long well filled with these interesting plants will prove in the flowering season that the Auricula is one of the loveliest flowers we possess.

— Staking Plants. —

The good or bad appearance of many tall-growing border plants depends, to a great extent, upon the way in which the necessary stakes are used for their support. An experienced cultivator will probably not use half as many stakes as one who entirely lacks experience, and yet succeed in making the plants look neat and natural. These are the two chief points to aim at, namely, sufficient support while retaining the natural habit of the plant dealt with. The novice very often contents himself with one stake for each clump of plants. A very good effect may be produced if much time is spent upon details such as those of tying out individual shoots; but the general plan is to tie all shoots in a bundle to the single stake, which is wrong. Most clumps of plants growing in the herbaceous border may be properly supported with three stakes. They must, as a rule, be placed to form a triangle with their tops pointing outwards. If fixed just inside the outer row of plants, the sticks will scarcely be visible and the shoots of the plants will fill up the centre of each clump. Single-stemmed plants only require one stake each, and it must be fixed behind the stem so that the latter will hide it as much as possible. All ligatures must be made secure, but not so tight as to damage the bark.

— Cyclamen. —

Seeds of cyclamen may be sown at once. Thoroughly clean the seed pots or pans and provide good drainage. Fill them to within half-an-inch of the tops with a prepared soil consisting of good loam, leaf-mould and sand. The soil should be passed through a quarter-inch mesh sieve and pressed firmly into the pots. The seeds of cyclamen are larger than most plants, and therefore the soil prepared for their reception may with advantage be used in a coarser condition. Place the seeds about 1 inch apart, and cover with a quarter-inch layer of soil. Place a thin layer of old sifted manure on the surface as an aid in checking rapid evaporation and also in keeping down the growth of moss.

The seed germinates very slowly and very irregularly, some plants being ready for removal before many of the others have started. The plants may be carefully taken from the seed pots as they become ready and transferred into others 2 inches in diameter, using a compost as advised for the seed pots. As the plants grow pot them into 3-inch pots, and at this shift use rather less sand with the soil. In potting always take care to leave the crown of the corm clear. Do not allow to become dry at any time, or they will quickly fall a prey to aphis; should this appear it must be checked at once. gation. As the season advances give air to the plants to encourage a sturdy growth, but in doing this be careful to avoid draughts. They will flower freely in 5-inch pots if carefully potted. A little dried cow manure finely broken up and mixed with the soil is beneficial.

Well-grown plants of cyclamen are very beautiful, especially some of the new shades of colour produced from seed of select strains which are now procurable, and the flowers are useful for a variety of decorative purposes.

Lawn Mowers.

The quality of work a lawn mower does and the amount of labour involved in doing it depend very largely whether the user is or is not conversant with the mechanism of the mochine and able to adjust part to part so that the mower may do its work smoothly and with the least possible friction and labour. When the mower is in its best cutting form, throwing the cut grass straight out, the whirring sound of the revolving knives is pleasant to the ear of one who understands its working. Not so, however, when instead of this clear sound one hears the muttering and choking-like noise it makes, when instead of cutting the grass cleanly the knives are simply pulling it between the plates, incresing enormously the work of the horse or whatever power is used, and leaving work behind it which is not fit to be seen.

There is very little to be learned about the management of a lawn mower, and that little may be taught by a verbal lesson in a few minutes, but is not so easy to convey it in writing, and every buyer of a machine should get from the seller both verbal and printed instructions on the three most essential points, namely, the proper way of adjusting the knives to the plates, of the proper adjustment of the front rollers, which regulates the cutting, whether high or low, and how to tighten or slacken the chains as the case may be; also as to oiling, for when the machine has been used for some time the oil holes get filled with dirt, and the inexperienced does not always know where to look for them.

To Preserve the Colours of Pressed Flowers.

It is not easy to give a general rule for this, as different kinds of flowers require different treatment. Do not press a bunch of flowers together; spread them out so as to be clear of each other. If you have a bunch of May, snip out half the flowers and press them separately; then, if necessary, you can put them back again after they are dry. In some flowers it is necessary to separate the petals and press them singly, and then put them back again, as in a red Poppy. Juicy flowers, like Bluebells, must not be pressed very hard at first, and the blotting paper must be fsequently changed and warmed, as they take a long time to dry; while Harebells can be pressed harder and dry quicker. To get the flowers to look well requires much care and patience and constant attention; there is no short way of attaining it. It is better to press several specimens of the same flower, and then, after they are dry, choose the best ones to stick down on the paper. The best stuff to stick them down is cold French glue, bought in little bottles at the artists' colour-men; very strong gum will do. Stems and sticks should be held down with little slips of paper. Do not stick flowers in books, unless you want to fill the book with patterns for ornament. Separate sheets of cartridge paper are better for a botanical collection.—"The Gardening World."

The Best Way to Keep Flowers Fresh as long as Possible.

Some flowers will not continue fresh in water even for a day. Not only do they fade, but the whole thing withers as if the stalk failed to reach the water. By a knowledge of a few simple facts much disappointment and vexation may be avoided. In the first place, all flowers should be put in water as soon as possible after they are cut. If left out of water for some time the cut ends become dry and shrivelled, with the result that some of them have a much lessened power of absorption of water. In such cases a half-inch or so should be cut off, the ends of the stalks immediately before they are put in water. This is a good plan to adopt with flowers which have been travelling; in addition to which, in such cases, they should be immersed in water up to their heads for an hour or so, and if the water is tepid so much the better. Some flowers, like Poppies, Stephanotis, Convolvulus and some Campanulas, need a little extra care, as the juice sometimes solidifies at the end of the stalk, and so impedes the absorption of water into the tissues. For these and similar flowers split and cut the ends a little way immediately before putting them in water, when the milky juice exuded is washed away. Lenten Roses, Gaillardias and some perennial Sunflowers and Phloxes are very often unsatisfactory as cut flowers, especially the two last named, as anyone looking at the cut-flower section of a summer flower show must have noticed. If the stalks are split a good way up immediately before being put in water, and the whole of the split portion immersed, the tendency of these flowers to wither will be reduced, and sometimes they will last as long as anything else.

It is the flowers with woody stems that often present the greatest difficulty—Lilac, Guelder Roses, Syringa, flowering Currant (Ribes sanguineum), May, wild Roses, etc. In addition to cutting the ends of the stalks just before putting them in water, some recommend in such cases peeling the bark 2 inches from the end; others slitting the stems a little way up; others loosening the bark without removing it; and others cutting off the ends with a long, slanting cut. All these devices are more or less effectual, some answering better with one thing and some with another. This has to be learned by experience. Some water plants, too, are very difficult to keep alive when cut. Our English Horsetails and some of the tall Water Reeds will only keep well in water if several inches of the stem are immersed and little notches made along the immersed portion—one notch in the upper part of each inter-nodal portion—so as to let the whole stem be filled with water.

Changing the water every day helps to preserve the flowers in beauty, and is advisable in the interests of the health of the household. The water very soon teems with infusoria, and these rapidly set up decay in the cut ends of the stems. It is often possible to change the water without disarranging the flowers; while certain floral contrivances as wide, open bowls permit of the flowers being taken out en bloc and the bowl emptied and refilled. With very choice and scarce flowers it is worth while again cutting off the ends of the stalks at the same time. Various things are sold to put in the water to make cut flowers last longer, possibly by arresting putrefaction. A teaspoonful of Condy's Fluid to a pint of water is probably as good as any of these.—"The Garden."

Garden Labels.

(From "The Park and Country.")

The problem of labelling trees after they have reached a considerable size is simpler than that of labelling other plants. I have studied the subject very carefully in this country and abroad and, much as I like the geographic label, bearing in addition to the ordinary lettering a map of the world, marked in color to indicate the range of the tree. I have not found any map which is capable of being reproduced so as to stand our rigorous climate, though in south-central Europe such labels are successfully used. The cost of making them is also a more expensive item with us than on the other side, but I believe that a simple map of the world could be transferred to a graniteware enamel by the use of transfer paper, such as the manufacturers of graniteware use for putting their own lettering on their goods. We make use of an elliptical label, cast of the zinc alloy known as white bronze. Labels of this kind are rather expensive, costing from 65 to 75 cents, as I recall it, for the sizes that we use, namely, 5⅝ x 3¼ and 8 x 4⅜, the smaller curved to a radius of 12 inches and the larger to a radius of 15 inches, so as to adapt them to the size of trees upon which they are likely to be used. The lettering is raised, and, if wished, can be brought into contrast with the rest of the label, either by painting over the body of the label, leaving the letters clean, but in different color, or by leaving the body unpainted and painting over the tops of the letters. We fasten them by smooth brass escutcheon pins about an inch long (short enough so that they may draw as the expansion of the tree pushes the label out), and the pins are placed through two holes in a vertical line.

All plants too small for a label of this kind have to be marked, either by labels stuck into the ground, or twisted about or wired on to the plant. For the former, which we make extensive use of in herbaceous beds and the like, and also in front of some trees and shrubs, we employ a label stamped out of sheet zinc, about ten inches

long. On this we write with a dilute solution of platinum tetrachloride, which, though more expensive than the other inks which may be used on zinc, is more permanent. The zinc is thoroughly polished off to remove all trace of grease before writting, and is then wiped over with a very slightly oily rag afterward, to turn water quickly.

For small labels, which are fastened to the tree or shrub, I have no doubt that thin copper labels, written on with a stylet over a soft surface, so that the writing is indented, instead of being colored, are the most successful, but a zinc label written on with platinum tetrachloride may be similarly used. These labels are in the form of very narrow triangles, tapering from, say, one inch or less to a point, in length of, say, six inches, and the smaller end is coiled round and round one of the twigs. Labels of this kind, however, are not suited to display purposes, and for display purposes we use a quadrangular label, with the angles shaped to taste, and measuring about 2 x 3 inches, on which the data are written in platinum tetrachloride, while the label is hung by a copper wire very loosely twisted on to a twig. No labels of this kind, however, can be expected to remain very long in position. They require constaot care. Either the electrical action set up wears the copper or the rim of the hole in the label through which the coppoer wire is passed or the label is neglected long enough to pinch and amputate the twig, but with reasonable care they are more likely to remain in place than labels stuck in the ground in front of the shrub.

I have tried celluloid and a variety of other labels, but do not think that any of them compare with these zinc alloy and sheet zinc labels, and yet, as you can see from what I have said, these labels are by no means all that one could wish.

I ought to say that in Kew they use sheet lead labels for these purposes, the label being of an appropriate size and of sheet lead about one-eighth inch thick, in which, with steel punches, they stamp the desired lettering. These labels are nailed by a single nail on the trunk of a tree, or hung to branches by a wire, as with the zinc labels that I have spoken of. The indented letters are filled up with white lead or something of the kind to make them easily legible.

Objections have been found to the greater number of garden labels. The cheap, thin wooden ones soon rot, and the writing becomes indistinct. The compensation forced upon the gardener for this, however, is the necessity of frequeot renewal, and the practice he thus gains in writing and learning plant names.

The many forms of indestructible labels are either too difficult to prepare, or if made by others, they are too expensive. Cast iron ones have been used in many public and private gardens, but they are bad in many ways—they are dear, they get in the way of the mower and the scythe, or are hidden by grass, they corrode in time, and even become targets for stone-throwing boys. I have known them to be changed and thrown around over a wide area by the mischievous urchins. Fortunately, the collection in which this happened had a gardener in charge who had a wide experience, and who, in addition to the iron tallies, has a systematic system of zinc labels which were tacked to the trees, wound around small shrubs, or stuck in the ground for herbs.

For durability, cheapness, and usefulness, it is doubtful if the zinc label can be improved upon. Its general utility is all that can be desired, for thin sheet zinc can be had of most hardware men, plumbers, and metal workers, and cut in any shape—the simpler the better. For general purposes strips may be cut in the manner above of any size, thus making two labels, which may either be stuck in the ground, have their thin ends lapped around a twig or branch, or the strips may be used uncut, and when written upon, rivetted to a foot of telegraph wire, and form a cheap T-shaped label.

There are different ways of marking these. Probably the best for public parks, where conspicuousness is required is first to paint the zinc black, and then have a painter letter them in white. Various indelible pencils and inks are also used for writing on zinc, one of the simplest of which is made by dissolving a few grains of cobalt (salts) in water. This can be written with a clean pen, and probably has some magnetic action on the zinc which leaves an indelible impression. Care should be taken to avoid blotting by simply laying the written labels up to dry.

Such writing will be legible after several years' use in the ground, but whatever label is used nothing should prevent the necessary annual overhauling.—James MacPherson.

The Garden Fireheap.

— Its Value as a Fertiliser. —

It is not every gardener who realises the real value of the ash, charcoal, etc., that are made by a fire where all sorts of stuff is burnt. Some gardens are situated where it is not possible to keep a fire burning, but there is a large number where it could be done. During the wioter, if all the prunings of shrubs and fruit trees as well as the rubbish were burnt it would be found very useful. After burning a good heap it should be opened, and all good lumps of charcoal raked out and put in a corner where it can be kept for future use. If it is hot it should have water poured over it, as when it comes in contact with the air it will gradually crumble into a white dust, but being damped will prevent this. The rest of the heap comes in for a number of purposes.

In gardens where the land is light sandy or gravelly it would be a mistake to add this material, but in wet, low gardens or where the soil is rather clayer, it is invaluable. Spread it with a shovel over ground where onions will be sown or planted out, or after they are well up in the drills; it could be sown over and worked in with the hoe.

For plant potting it is also useful. If fine charcoal from a fireheap, with some of the white ash taken away were mixed with potting soil instead of so much silver-sand, it would be cheaper and better for the plants. Clean sand is rather costly by the time it reaches the potting shed, and what is there in sand after all. Of course it is required for a good many tender plants, and is useful for striking cuttings of different things, but there are also many things that will do just as well without it.

Liquid Manure Barrel.

When selecting a barrel for mixing liquid manure in, care should of course be taken to see that it is thoroughly sound throughout.

It is a good plan to give it a couple of coats of waterproof paint inside and out—some people prefer to fit it with a spigot on the side close to the bottom. It will add much to the usefulness of the barrel if the bottom is reinforced or strengthened with a coating of cement, which will probably have to be done sooner or later, as barrels used for this purpose are prone to decay, but properly cared for will last for years. It will be found much easier to do it while the barrel is sound and good than after the bottom is on the point of falling out. Use a mixture of three parts sharp sand to one of cement, mix with water, using it quite stiff, and place about an inch in the bottom of the barrel, tamping it down until the water rises to the surface; when set, but before it becomes dry, give a second coat of clear cement, bringing it well up around the sides and about the spigot, if a wooden one is used, but not about an iron one.

In using the barrel place clean straw in the bottom—enough to come up above the spigot—and fill with manure to the top and then with water. The barrel should be placed in a convenient place, and on a support high enough to set a watering pot under the spigot. The bottom of the barrel should not rest directly on the box, or whatever is used to support it, but have three or four tiles inserted under the rim of the bottom; this allows the air to circulate under, and prevents the decay, and if the manure barrel is kept in order from year to year, it is ready for use in the spring, and there is that much less to do and provide, and the cost of a barrel saved will buy a new rose, or some other desired plant.

On Orchard Harness.

By L. J. Wicks, of Balhannah.

The advantages of the patent "Orchard" Harness are so obvious that it is almost superfluous to mention them.

In the first place it is evident that no matter how short a horse may turn he cannot get his foot over a trace, nor get entangled in any way in his harness. Shorter turnings are therefore possible; and, since the horse is generally between two and three feet nearer his work than is practicable with ordinary harness, he is much more under control, and can even be turned so short as to pass the implement he is pulling, within a couple of feet.

In consequence of these facts the driver can do better work, and has the satisfaction of knowing that the lifting of a hook will effectually disconnect the horse from the work, leaving him quite free, with no traces to be hung to backbands, or left to dangle from the hames.

By far the most important advantage to be derived from the use of the harness, however, is the immense saving effected—directly, in fruit, which would otherwise be torn from the trees in the course of a season's cultivating, with the old harness; and, indirectly, in the saving of fruit spurs which are constantly meeting a similar fate.

Every orchardist knows only too well, the feeling of helpless wrath, as he has watched a beautifully spurred branch pass under the drag chains near the collar and, before the team can be stopped, emerge from the angle caused by the joining of trace and swinglebar, a hopeless wreck.

With the introduction of the Orchard Harness all this is altered, and the horse can do no more damage in brushing past trees than if he were quite free of all harness.

Another point, worthy of mention, will be of particular interest to the Hills market gardener, is that the harness makes a splendid double trolly set, the bar making a splendid breeching for coming down long hills, a short chain about one to two feet in length, being all that is necessary to attach it to the trolley; and the old swingle-bars may be taken off and hung up.

Used as a leading set it is even more valuable, as all that is necessary is one light two horse swingle-bar attached to the pole with a couple of feet of chain from swinglebar to harness. This brings the leaders several feet nearer the driver, thus giving him better control; while, at water-troughs, by lifting two hooks, the leaders can be swung clear of the team, giving the pole horses access to the water.

Just a word in connection with the use of the harness in actual orchard practice.

The draught of many of our implements is arranged very near the ground, and, if too short a chain be used to couple the horses to the implement, weight will be thrown on the horse's rump. Care should therefore be taken to see that when the horse is pulling, the harness makes a straight line from the point of connection with the hames, right through to the implement being drawn. If the harness is thus nicely adjusted no harm can possibly be done to the horse, and it must become a constant source of pleasure to the user.

In conclusion, the article has certainly passed its experimental stage, as several sets have been in constant use at Balhannah for nearly two years; and the two original sets are still in use and highly valued by the owner.

Eruptive Diseases, or "Exanthema," or Orange Trees in Australia.

In the June issue of the Victorian Journal of Agriculture Mr. C. C. Brittlebank, Vegetable Pathologist's Office, writes :—

"From time to time specimens of diseased oranges, together with their leaves and branches, have been forwarded to the office of the Vegetable Pathologist, with a request that a determination of the disease be made, and, if possible, a remedy suggested. When on a recent visit to the capital of a sister State, a request was made by several fruitgrowers that I should visit a number of orange groves in which an unknown disease had appeared, as this was causing serious trouble to the growers, so much so that they intended to grub out their trees if relief could not be obtained. During this interview I was informed that they could not obtain any information as to the cause or control of the disease. A visit was paid to the district and an examination of the diseased trees made. This, together with the knowledge gained from specimens forwarded to Melbourne, soon convinced me that the trouble was physiological, and not due to any special fungi.

— Description of the Disease. —

A most striking feature of this disease is the general healthy appearance of the trees, the leaves of which are of a beautiful dark-green, and frequently nearly twice the normal size. This apparent symptom of health is followed by a yellowing of the young tender shoots, from which the leaves fall. Soon after, or concurrent with the fall of the leaves, the shoots turn reddish-brown, owing to the middle layers of the bark becoming engorged with a resin-like substance. Twigs affected as described die back for a length of from 6 to 12 inches. Numerous bushy twigs arise from the smaller branches, these, however, soon die away, giving the characteristic appearance to diseased trees. When a number of affected shoots are borne on a larger branch the bark of the latter is often blistered, split, and ruptured to such an extent that the injured portions become almost confluent. From these injuries a hard rusty-coloured resin-like gum exudes ; this granulates on the edges of the injuries and does not run or collect in tears, as in some other citrus diseases.

An examination of the bark shows that the actual ruptures do not extend into the cambium or sapwood, but generally only affect the middle layer of the bark outwards. However, beneath the ruptures numerous minute gum pockets are formed in the sapwood directly beneath the ruptures. These appear as clear glass-like specks, if a shaving be removed and held against the light. Sometimes even before the tree shows any sign of disease in leaf or shoot, it can be detected by the pale unhealthy colour of the fruit,

which often falls before becoming mature. Oranges borne on affected branches are frequently stained by the reddish-brown exudation which hardens the skin, causing them to split or crack. In some instances the diseased fruit becomes quite hard, and in others it falls early. Even those which remain ripen prematurely, and are of a pale-greenish-lemon yellow, and quite insipid to taste, as are also the green immature oranges.

— Nature of Soil in Affected Areas. —

As nearly all soils are determined by the nature of the underlying geological formation, and as the main mass is composed almost entirely of siliceous sandstone, this is broken down and is then washed from the higher levels, and deposited on the lower slopes at the foot of the hills. From the nature of its source and deposition it is, as would be expected, of a light porous nature. As this soil was being formed, more or less vegetable matter was brought down and mixed through it, but this would be, comparatively speaking, quickly removed, more especially if the surface soil be kept free from plant growth.

Several of the orange groves are on this type of soil, some of these were planted many years ago, and as a consequence they have withdrawn a large quantity of the available plant food within their reach.

Even in the area of a single plantation the deficiencies of plant food in the soil vary to a considerable extent, affecting both the growth and yield of the trees. Generally speaking this is perhaps one of the most fertile sources of trouble as the weakened vitality and starved condition of the trees lay them open to attack from various citrus diseases. So far as I could ascertain no manure, with the exception of bone-dust, had been used in the affected area. That this disease is more prevalent in those areas which are of a dry porous nature and in which there is a lack of organic matter is easily seen. Trees growing in a more retentive soil are in this case not affected with "Exanthema," although they may be, and often are, attacked by collar-rot and other diseases. All the evidence collected in the field points to the lack of organic matter and an open porous sandy soil being the chief factors in causing this trouble.

— Methods Suggested for the Control of the Disease. —

Such being the case methods must be adopted which will render the soil more retentive of moisture and at the same time supply food for the trees. Ploughing in green crops of oats, barley, rye, or wheat, which have been previously manured with superphosphates should be used sparingly, if at all, on the diseased areas, as they appear to have a deleterious effect upon the trees. Discretion must be left to the growers as to the best method of cultivation and crop suited to the district.

Care should also be taken that no bud wood be taken from trees which have been affected, as they might possibly be more susceptible if placed under favorable conditions for the development of the trouble.

The conditions favouring the development of the disease are :—1. Porous light deep, coarse or sandy soil, lacking organic matter, and which quickly dries out after rain. 2. Continued drought followed by heavy rain. 3. Large amounts of nitrogenous manures.

Illustrations of various phases of the disease accompany the above article in the Victorian Journal of June last.

Interstate Band Contest for Adelaide.

Arrangements have been made by the Band Association of South Australia, to hold an Interstate Band Contest in Adelaide, in May next, who have already received promise of support from a number of the best contesting bands from the other states, providing sufficient inducement is offered in the way of prize money.

The Association purpose offering £150 as a first prize for A grade Bands, and £50 first prize for B grade Bands. The total amounts of prize money for Selections, Quickstep and Solo items will be £350.

It is proposed to get one of the best judges from England to adjudicate, and it is not unlikely that the services of that Prince of Adjudicators Jas. Ord Hume, will be obtained.

At least £500 will be required to carry out the Contest, and to raise the balance of the money the Association have arranged a scheme that should appeal to everyone in this laudable object.

Registered copyright coupons are being issued to the value of 1/-, 5/-, 10/- and 20/- each. Such coupons are interchangeable for admission tickets to their full face value when the contest takes place, so that those who buy coupons will receive the full value of their money.

This should appeal especially to business people, as a contest held in Adelaide would mean a great deal to them. It is estimated that during the contest at Ballarat, at least £50,000 is spent during the month. It would also be a splendid advertisement for the State. Members of the Association, and the affiliated bands have undertaken to sell the coupons, and it is hoped the public will respond heartily, and make it possible to carry out this contest.

Full particulars may be obtained from the Secretary of the Band Association, Mr. R. W. T. Correll, at 140 Rundle Street, Adelaide.

The attention of our readers is drawn to the fact that Income Tax Returns are due on or before the 1st February, except those of farmers only, which are due on or before the 1st May. Forms of returns are to be had at all Post Offices. Postages must be prepaid in every instance. Fines and interest are imposed by Act upon assessments of late returns, and no remission can be made of same. Returns must be signed by the taxpayer. No agent or attorney can sign returns for principals resident in this State.

Plan of Orchards.

The following notes on this important matter are from an article on Planting an Apple Orchard in the Victorian Journal of Agriculture :—

An orchard should be so planned out in sections as to insure the most economical advantages in working as well as to secure interpollinating influences. The varieties blooming about the same time should occupy either adjacent sections, or two or three rows of the one you wish to predominate should intervene between two rows of another variety. By this means interpollination can take place and when spraying and picking come round they can be carried out with greater facility than would otherwise be the case.

To secure success eventually, every tree should each year record at least standard progress, so that when the orchard comes into bearing the owner will have, as far as possible, trees of uniform sile, vigor, and reproductive capability. We cannot but expect a few weaklings amongst some hundreds of trees not thriving, but these bebeginning of the young tree's life it had to undergo two serious operations—one of root-grafting, the other of budding. If any of these weaklings should prove unresponsive to special treatment during the first couple of years they must be replaced by more vigorous ones of the same varieties. There are other causes for trees not thriv,ng, but these become local problems, due, probably, to local conditions, and must be solved by each individual grower for himself.

Every orchardist should aim at raising such a tree as will be capable, on its coming to maturity, of giving the maximum return, so that during its early life its potentiality should be considered, its health conserved, and its frame developed to this end.

— Cultivation. —

In the spring succeeding planting plough away from the trees six or eight inches deep. Plough not deep enough to injure the roots when near the tree, increasing the depth as you get free from the roots. This method tends to establish a deep root-system, and prevents injury later on. The whole of the orchard need not be ploughed, but a strip about four feet wide on each side of the trees, as this is sufficient for root extension the first year. To allow of further feeding area for the roots the width of this strip must be increased, each succeeding year, by a couple of furrows on each side. The young trees will require thorough cultivation at regular intervals during summer, so as to maintain normal growth. In autumn plough somewhat deeper and up to the trees, and leave it in a rough state, to permit of the ameliorating influences of winds, rains, and frosts.

Varying the depth of ploughing in autumn and spring enables the grower to maintain the same depth of cultivation throughout plant life, besides obviating the formation of a plough pan caused by constantly ploughing to the same depth. The top soil is continually imbibing nourishment and moisture from above, and the intervention of a plough pan prevents the access of these to the root-system of the trees. The plough pan also interferes with the interchange of heat that is constantly taking place between the surface and subsoil.

Cultivation of the young orchard must not be overdone. All that is necessary is to keep the trees growing continuously, and moderately vigorously, during the period of active growth. If the trees are making too rapid growth cultivation must cease, as strong wood growth one year gives subsequently small fruit crop. In order to permit the leaves to ripen cultivation should cease two or three weeks preceding the occurrence of frosts.

There is a period in the bud's growth when it is waiting for food necessary to define its character. Any stimulation to the roots due to cultivation or other causes at this time will drive it into wood growth. The lowering of food supply by the stoppage of cultivation or by cultivating so as to dry out the moisture modifies sap flow, and thus causes leaves to ripen, and form fruit buds. When sap is elaborated to form fruit buds there is little moisture in the soil. So, by intelligent cultivation spur formation can be controlled to a great extent, and trees that are making abnormal growth can be brought into bearing.

When once trees are bearing cultivation should be increased, for the production of a crop entails a dual function on the part of each bud, viz., the supply of nourishment necessary to the development of its fruit, and the production and maturing of a fresh fruit bud to bear fruit the succeeding year. In order that the buds may be able to perform these functions thoroughly they must have plenty of food, and therefore the plant-food inherent in the soil must, by cultivation, be rendered available for the roots to take up.

No portion of the orchard should remain untilled. By means of a false head to the plough and a long chain the ploughing can be done right up to the trees in most cases. What cannot be done this way must be accomplished by hand. (The use of "Orchard" Harness, referred to by Mr. Wicks elsewhere in this issue does away with any necessity for hand work. Ed. G. & F.) During summer the surface soil should be kept in as fine a serve the moisture. The smaller the state of tilth as possible to conparticles of soil can be rendered the greater the capillary attraction, and the films of moisture surrounding these particles reduce the plant-food to a soluble state by which the roots are enabled to obtain nourishment for the wood and buds above.

When the orchard is young, growers are often found producing cereal crops between the trees. This is a great mistake. An ordinary crop of hay is computed to take about 300 tons of moisture out of an acre ; and as this hay is cut off in late spring the fruit trees begin their summer in a dry and thirsty soil. Owing to the want of moisture the food that is in the soil is unavailable to the roots of the trees. If the orchardist must grow something, a few rows of potatoes or strawberries or other crop that will require summer tillage may be grown, but at such a distance from the

trees as not to interfere with their roots.

The primary object, that of establishing an orchard profitable throughout a long life, must not be lost sight of. Time is too short to rectify serious errors in the establishment of an orchard, so do not woo returns from catch crops, probably at the expense of your fruit trees hereafter. Many have done so, and wish they had not.

— Manuring. —

As a rule the young orchard requires, if any, but little manure. It is a mistake to have to amend root treatment with the knife. All the grower wants in his young trees is standard progress—even, moderate growth. If his trees are not doing this for him 2cwt. of bonedust to the acre will remedy matters. But when his trees come into bearing they will require liberal and intelligent feeding.

Owing to the variability of soils even in the same orchard it would be useless to give here any special treatment for any one orchard. The grower must study closely the behaviour of his trees, the surrounding circumstances that may modify their growth or their bearing, and by experience—the only infallible guide—determine and supply their requirements. He must understand that the tree requires every element of plant food and soils rich in any one of these elements in an available form are not visibly benefited by its addition in an artificial form. In fact, only those constituents in which the soil is deficient should be added in the form of fertilizers. By the soil's deficiency in any particular constituent is, of course, meant when that constituent is unavailable to the plant.

Concentrated fertilizers though strong in chemical quantities are lacking in physical action, and should be regarded only as supplementary to thorough tillage and green-manuring.

The incorporation of organic matter with the soil, as in the case of green-manuring, ameliorates its physical condition. It influences the warmth and moisture of the soil alters its mechanical constitution, and renders it in a better state for the appropriation of food by the plant.

Lime in low form added to the soil has no mechanical effect, but when quicklime is added at the rate of 30 cwt. to the acre it has mechanical action by forming ggses and causing movement and air passages.

As nitrogenous manures supply mechanical action by forming gases it follows that if, in the early life of the orchard, trees are making insufficient progress this constituent must be supplied them. The aged tree, also, debilitated through bearing, is more responsive to nitrogenous manures than to any other kind. The grower can tell when his trees demand this particular food by their pale, sickly leaves, and weak wood-growth. Trees grown on soils rich in nitrogen have dark green foliage which they retain late into the autumn. Any deficiency in this respect in the soil can be readily amended by the application of farmyard or green-manuring.

Drying Fruit—for Amateurs.

— To Dry Apricots and Peaches.

Apricots for drying should be fully ripe, but not soft enough to be mushy; by the use of sulphur an amber-colored semi-translucent fruit is obtained. Pick the fruit without bruising: pit the fruit by a clean cut completely around in the centre; do not cut part way round, and then that apart — a clean-cut edge is essential; put on the trays, with the skin down, or with the cup up, as it is sometimes described; sulphur, and then put out in the sun. About four days' sunshine will finish the apricots. Apricots will yield on the average 1 lb. of dried fruit to 5 lb. of fresh.

—To Dry Prunes.—

Dip in lye to thin and crack the skin which facilitates the escape of moist ture in the drying process. In a large cauldron lye is made with 1 lb. of concentrated lye to each 20 gallons of water, and kept boiling hot; or 1 lb. of washing soda to two buckets of water. Put the fruit into wire baskets, and then dip into the boiling lye for about a minute, or until the skin has a wrinkled appearance; then plunge the basket into clean cold water to rinse off the lye. The rinsing water must be frequently changed, for it soon becomes very alkaline. After this dipping the prunes are placed on trays ready for the machine-drier or the sunshine. In the sun the prune dries sufficiently in from one to two weeks, according to the situation and weather. When sufficiently dried, the prunes are put in boxes to sweat for about two weeks, and then they are ready for packing

— To Dry Apples.

Peel, slice, and core the apples; then put them on trays; put in the sun for about two days, or in an evaporator for four or five hours. Quinces and pears may be dried in the same way.

— Sulphuring. —

The most common chamber in use for sulphuring fruit is a bottomless cabinet, about 5 ft. or 6 ft. high, of a width equal to the length of the tray, and of a depth a little more than the width of the tray. Place ½ lb. of sulphur in a pan beneath the fruit trays, and ignite it with a hot coal; burn the sulphur without moch fire, so at to avoid high heating. The above quantity will be sufficient to sdlphur 40 lb. fruit. Apples, peaches, raisins, and apricots will requiring sulphuring from 20 minutet to one hour.

The desirability of applying sulphur fumes to fruit is questionable: but the practice is necessary to meet the requirements of purchasers, whose demand is for a light colored fruit.—For home use sulphuring is not necessary.

Fruit Harvesting.

A few remarks upon fruit harvesting may at the present urove interesting and useful to many growers, whose experience is limited. The main consideration is to gather all kinds at such stages of maturity as develop their good qualities to the fullest extent, or best serve special purposes. As a matter of course, the proper degree of maturity varies considerably with different kinds of fruit, and the varieties of one species often require dissimilar treatment. Pears require more judgment in harvesting than any other fruit, as they are peculiar in their mode of ripening. As a rule they must not be allowed to ripen on the trees, as when such happens the fruit is deficient in flavour, aod will not keep. The requirements of different kinds in this respect varies considerably, according to the kinds. From three to four days after gathering will be sufficient time to bring a Jargenelle to perfection, while as many months are required for such kinds as L'Inconnue and Winter Nelis. The most useful and popular varieties, remarkable for their high and luscious flavors, will be insipid, and comparatively worthless if allowed to ripen on the trees. As to when the fruit has reached the proper stage for gathering, one of the signs known to growers is when the stalks will separate easily from the branches when the pears are gently raised. What is known as the seed test is also a fairly good guide. If the seeds are black or brown, hard and plump, it is a sufficiently good sign that the fruit is ready for gathering. Apples may be kept till they have almost reached the full degree of ripeness, and signs of this are the same as mentioned for pears. If allowed to become over-ripe upon the trees they are apt to become mealy, their flavor deteriorates, and they will not keep well. Plums attain the greatest perfection when they are allowed to get thoroughly ripe before they are gathered. They should therefore, if required for dessert or drying purposes when practicable, be allowed to hang till fully matured. When, however, the fruit is required for distant markets it must necessarily be gathered at a less advanced stage, but it should be left as long as circumstances will permit. If wanted for preserving or cooking plums may be gathered as soon as they are fairly colored, and the flesh is moderately soft. Peaches and nectarines are richest in flavor when allowed to get perfectly ripe upon the trees, and are then also in the best possible condition for canning or drying. Being very tender fruits, however, when required for market purposes peaches and nectarines necessarily have to be gathered at an earlier stage of maturity, that is, as soon as the flesh shows signs of becoming soft. Quinces should be fully ripe before they are gathered, the indications of maturity being the same as for apples.

Summer Pruning.

Summer pruning is not so generally practised in this part of the world as it ought to be, considering how serviceable it is in the orchard and shrubbery. When trees are making a dense growth of new wood and forming a much larger number of young shoots than are required, then summer pruning will prove very useful for ornamental trees and shrubs, and also for fruit trees. More especially is it required for the last-named class, as the free admission of light and air through the branches is essential to the maturing of both fruit and wood. Both light and air are necessary to enable the leaves to do their work of elaborating the sap properly, and allow the plants to make healthy growth. When growth is so dense that a large proportion of the foliage is smothered up the wood ripens imperfectly, and there is usually a deficiency of fruit buds for the following season. Therefore a little attention in the removal of surplus shoots will be a wise expenditure of labor, and the work is easily and quickly done. In fact summer pruning is more economical than leaving the trees to themselves, as it saves a good deal of work at the winter cutting. It should also be remembered that there is a waste of the trees' energies when they are allowed to make a lot of useless wood that has to be removed at the winter pruning. Then, again, it must be borne in mind that stone fruits, and more especially cherries, have often a tendency to "gum" after winter pruning, and more especially when large branches are removed, a trouble that may be mainly avoided by regulating growth in the summer.—Exchange.

— Loquats. —

Now that the loquat trees are free from fruit, they should, if possible, be gone over with the clips, cutting away all the old fruit-stalks on which this year's fruit was carried. If the grower will take notice he will find that new shoots will put out just at the base of the old fruit-bunch, so that it is not wise to cut back farther than the base buds. A little study of the tree will show the bearing habit.

— Codlin Moth. —

The bandages for codlin moth caterpillars should be regularly examined, and all apple and pear trees should be gone over weekly, and all infested fruit picked off and destroyed. If the growers will do all in their power to destroy all the first brood they will be saved some of the annoyance and loss with their later broods, which are the cause of trouble when the fruit is ripening.

Lady: How long is it since you have done any work? Tramp: I'm not quite sure lady. I forget whether Iam forty or fifty years old.

Mulching Vegetables in the Home Garden.

— An American Opinion. —

Whether mulching will prove satisfactory depends in part upon the location of the garden and the character of the season. In general, mulches may be expected to give better results in normal or rather dry years than in seasons of unusually heavy rainfall. Similarly, in very wet seasons better results may be expected from the use of mulches on high land than on low land. (In Australia mulches either of litter or fine soil are practically good everywhere for summer work).

Whether mulching shall be used in a particular case depends also upon the vegetables to be grown. Early spring vegetables requiring only a few cultivations can usually be grown more cheaply by cultivation than by mulching.

Furthermore, very early mulching, before the ground has become thoroughly warm, is apt to retard the development of the vegetables. They want cultivation then.

On the other hand, summer or late vegetables that require frequent attention throughout the season are grown as a rule with less labor by mulching than by cultivation. Furthermore, the mulch can often be spread when other farm or garden work is not especially pressing.

The fact that most vegetables, especially the more tender kinds, cannot be mulched until they have become warm, thus requiring some preliminary cultivation, certainly increases the labor required in growing mulched vegetables over what would be necessary if the mulch could be applied earlier. But, if the impracticability of early mulching is a serious drawback to the use of mulches, so is the impracticability of mid-summer cultivation under farm conditions a serious objection to dependence upon cultivation alone. For most vegetables mulching should be used to supplement cultivation rather than to displace it. Such cultivation as is commonly given farm gardens is better for most vegetables in early spring than mulching, but mulching is just as surely better in mid-summer than the neglect which is the common thing in farm gardens at that time of year.

Not only are many vegetables grown with less labor by mulching than by cultivation, but the yield and quality of the product is also often improved. In several cases yields have been decreased by mulching. In some of these, however, the injury was due not so much to the use of a mulch as to its being applied too early.

The vegetables which, from experience, do not require mulching are drilled onions and lettuce. With drilled onions the stand of plants is usually hurt by mulching. With lettuce, it is also difficult to spread the mulch without injury to the stand, and the crop is harvested so early that it is not worth while to mulch.

In case of transplanted onions, beet, carrots, parsnips, peas, and melons, the results are not decidedly in favor of either of the two methods, both the yields and the required labor being about the same.

Results very favorable to mulching have been secured with cabbage, tomatoes, beans, cucumbers, potatoes, sweet potatoes, artichokes, and French beans. In all these cases the yield is increased on the whole quite decidedly by mulching, and the required labor decreased at the same time. Mulched cabbage produced larger heads than cultivated cabbage, and there was less injury from rot. The vigor of tomato plants was decreased by mulching, but the yield of fruit increased. The fruit was also cleaner and less subject to rot. Mulched cucumbers produced perfect fruits during dry periods when the fruit from the cultivated plants was small and imperfect. The quality of potatoes has not been hurt by mulching except in wet places.

Subsoiling.

This operation, which consists in stirring the soil below the depth usually ploughed, makes more room for development, and enables the plant to extract food and moisture from a greater area. By loosening up more of the soil, its capacity for absorbing and retaining moisture is increased. By absorbing greater amounts of moisture in winter and spring, provision is made against summer growth. The effects of subsoiling last from two to three years and are more marked on the growth of root crops, such as turnips, beets, carrots, potatoes and parsnips than upon others. The best test as to profit in subsoiling is to try it upon an acre and note carefully the yield and result as compared with a given area not subsoiled.

Water and Soil.

At this season of the year a little study of the relation of water to soil is appropriate. All are acquainted with the visible water in soil, but that does not constitute all. As a matter of convenience, water in soils may be divided in three classes :—

1. Free water, which soaks or flows through the soil after rain or irrigation.

2. Capillary water, which remains when the free water has run away. This is distributed through the soil by capillary attraction between the minute particles. It is this water or moisture which keeps soil moist, and feeds plants between irrigations or in times of drought.

3. There is the hydroscopic water, which is of no practical interest to the farmer or gardener, but is important in the analysis of soils. It is the thin film of moisture which coats every particle of soil, but which can only be detected by laboratory appliances. Take a dry clod of earth from a northern drought-stricken plain, or a handful of sun-dried sand on the sandhills, and either will contain hydroscopic water, which the chemist dries out by heating to redness, and carefully estimates when he is analysing a soil.

It is the capillary water which is of the most importance to the farmer or gardener, for it travels up, down, or sideways, and feeds his plants. A writer says :—

"An irrigation, or a rain, renews the supply in the lower strata, as well as at the surface. After the irrigation the capillary movement upwards begins again, induced by surface evaporation. Thus there is an oscillation of moisture in soils. The rapidity of the movement and the amount retained vary according to the fineness and character of the soil."

"These capillary movements upward, downward, and sideways carry dissolved fertilisers with them. Evaporation at the surface leaves the fertiliser there to be carried down by the next irrigation or rain ; hence, top soils are always the richest in plant food. Waste water from a farm means a much greater loss than the price of water, because valuable ingredients have gone with it. By not keeping winter storm furrows in an orchard, the rich, top soil may be lost, which is difficult to replace."

The action of water, unless carefully controlled, wears out a farm. Everyone knows how sediment collects at the lower end of a furrow. It came from the other end somewhere ; if a drainage or irrigation furrow is very steep for fifty or a hundred feet the trees in that space will be the first to show yellow, although they are nearest the flume and received the most water. This is because the nitrates have been washed to the lower levels. By putting manure or straw on the steep part the water will move more slowly and the soil and nitrates be retained where they belong."

Irrigating water cannot be handled too carefully. It is better to cultivate across the furrows last, as the tendency of the water would then be to travel sideways, and its movement, therefore, be slower. Do not turn on a heavy head of water until after the furrow is soaked a little and the fine earth compacted ; this will lessen the washing."

Certain forms of fertilisers are water soluble. Sulphate of potash, nitrate of soda, sulphate of ammonia, and the superphosphates are easily carried by water. If applied just before an irrigation they go to the deepest roots, or wherever water can go, and if there is any waste water a part of them is lost. When fertilisers are applied in the autumn or early winter the storm furrow should always be put in as a protection from the loss.

"On account of the solubility of the nitrates and other plant foods, improved methods of irrigation are always possible, the aim being to stop the wear and tear of running water. The ideal movement of water in soils is up and down with the least possible surface movement. In this way the rich top soils and fertilisers will be retained where they belong."

This is all good advice, and is based on the fact that plants take up their food only when it is provided in solution. The food may be dissolved by water, or by the direction action of the roots, or by the process of fermentation, which is almost constant in all soils. In either case, soil moisture is essential and a common carrier, and the way the water is used seriously affects the results obtained from fertilisers.

Vegetable Garden.

Cultural directions for this month may be summed up in the words water, hoe, and mulch. Each is good but together they about make up the whole art of gardening.

Pinch out runners of cucumbers, etc., to induce fruiting, and give liquid manure, a little and often.

Continue to sow French beans, and keep the plants in bearing, clean picked and the soil between the rows well stirred.

Sowings of cabbage and cauliflower may be made in frames or in any position where the young se?dlings can be shaded from the sun.

Lettuce and salads generally can be sown in suitable places, select where possible a bed of loose friable soil which will hold moisture for all summer ?alads.

Bitter Pit.

Mr. M'Alpine's Work.—First progress Report.

Mr. D. M'Alpine recently gave an address to the delegates of the Victorian Fruit-growers' Central Association in the Mechanics Institute, Somerville, regarding the mysterious disorder in fruit known as "bitter pit." Large quantities of apples, pears and quinces are rendered by the pit unfit for use each season, and the cause of the disorder has unsuccessfully engaged the attention of horticultural scientists in the principal fruit-growing areas of the world for over 25 years. Two years ago it was suggested that a special effort should be made in Australia to arrive at the cause and the cure. Conjoint action was agreed upon by each of the State and the Federal Governments. The Victorian Government plant pathologist (Mr. M'Alpine) was selected to carry out experimental work in every part of the Commonwealth. He has been allowed a period of four years in which to make an exhaustive investigation. Mr. M'Alpine commenced his difficult task a year ago last July. Since then he has visited each of the States, and has inaugurated a series of experimental operations which he is sanguine will produce satisfactory results before the end of the experimental term in July, 1915.

— Preliminary Work. —

Mr. M'Alpine said it gave him a deal of pleasure to be afforded the opportunity of addressing the selected representatives of the Victorian fruit-growing industry, from whom he expected to learn something concerning bitter pit. He was not prepared to dogmatise, or even indicate that he had yet formed any settled opinions in regard to the fruit disorder which the savants of older countries admitted had beaten them. The task he had undertaken to definitely deal with in the comparatively brief period of four year, was an exceedingly difficult one to handle. It was a particularly interesting study, and a deal of useful information would be gathered in addition to that dealing specifically with bitter pit. The investigations made during the first year were embodied in a progress report that was now in the hands of the Federal authorities. Mr. M'Alpine said that although the bitter pit row was a hard one to hoe he was happily circumstanced in knowing where to begin, and on what lines to proceed. No attempt would be made to draw scientific deductions until the full series of experimental work is completed. He could, however, mention that a good start had been made. The decks had been cleared for action; and, in his opinion, a few telling shots had been fired. An expert in a neighbouring State, Mr. M'Alpine said, had expressed the belief that bitter pit was a condition confined to Australia. That statement was not correct, as bitter pit always manifested itself wherever apples were grown. It could be confidently asserted that the disorder did no more damage in this country than it did in other parts of the world.

— Structure of the Apple. —

It was a fundamental principle, in pathological research, said Mr. M'Alpine, that the experimenter should look at the parts of the plants and fruit under consideration. In precisely the same way and to the same extent that a watchmaker required to be conversant with each section and part of the timepiece, so must the pathologist be acquainted with the subject he was called on to inquire into. So far as apples were concerned, little of their structure was known in the past, apart from the fact that the fruit consisted of skin, flesh, and a core. He (Mr. M'Alpine) had carefully and scientifically dissected several apples; and he now knew all about every detail of the internal structure, from the time the fruit assumed shape, after the flowers dropped, until the matured specimens developed on the trees. The first thing that arrested attention in an examination of the structure of an apple was the beautiful network of the vascular vessels at the base or stem end. From these main arteries finer distributing channels conveyed the sap to the core, from which it was circulated through the flesh by a more minute and increasingly beautiful system. Each of these veins and structural parts had been examined, and a knowledge of them would, in his (Mr. M'Alpine's) opinion, furnish the key that would ultimately unlock the door and expose the cause of bitter pit in fruit. Young vigorous trees produced more pitted fruit than older trees, because of the bursting of the main vascular tubes under too great a flow of sap. When that occurred the tissues of the fruit decayed and bitter pit was the result. An examination of the apple forced home the conviction that the fruit should be handled as carefully as eggs. The saying that "beauty was only skin deep" did not apply to apples and pears. There is reason to believe that bitter pit was a derangement of the delicate vascular tissues, and an effort would be made to ascertain the cause of the disorder by noting the results of soil treatment, judicious manuring, systematic pruning, careful irrigation, and suitable storage of the fruit after it had reached maturity and had been removed from the trees. It was along these lines that experiments were being conducted; and, without committing himself in any way, Mr. M'Alpine said he was free to state that a good start had been made on lines that already gave promise of a full measure of success.

— Theories Exploded. —

Many theories concerning the cause of bitter pit, Mr. M'Alpine said, had been put forward from time to time without anything like definite results. Mosquitoes, harlequin bugs, and insects of that character were blamed for causing the trouble by inoculating the flesh tissues. That theory was conclusively dissipated in the Burnley Gardens, where the fruit was covered, so that insects of any sort could not reach it. The disorder made its appearance just the same as on exposed apples. Attacks by fungi were said to be responsible for the unsaleable condition of the fruit: but that theory had to be abandoned, as there were no traces of fungoid life or growth associated in any way with the decayed tissues. The ubiquitous bacteria could not be connected with the disorder. Not long ago a statement that the fruit tissues were being destroyed by arsenical spraying solutions caused wide-spread consternation. A scientific pamphlet in support of the poisoning theory was published. Cleopotra apples experimented on at Deepdene, in accordance with instructions issued by the writer and author of the pamphlet, showed how untenable that theory was.

Mr. M'Alpine said he had arrived at the conclusion that bitter pit in apples was an internal disorder, and that it was due to internal causes. Quinine was the only thing with which he could compare the taste of tissues that decayed and presented a brown appearance. The derangement began beneath the skin, and always at the stem end or base of the network of vascular vessels that nourished the fruit. Replies to a series of questions submitted to growers last year were exceedingly useful in determining on what lines the scientific inquiry should proceed. Some varieties of apples were more susceptible to the disorder than others. Cleopatra and Annie Elizabeth were the most sensitive to bitter pit; and the Yates variety resisted attack better than anything else. Mr. M'Alpine said that with a complete knowledge of the internal structure and composition of the apple he would be reasonably certain to arrive at the correct conclusion as to why one variety was taken and one was left. It was noticeable that the disorder was generally worse in wet than in dry seasons, which fact appeared to indicate that drainage and the control of moisture should be specially experimented with. Tillage of the soil, green manuring, and the use of lime were matters that would be specially inquired into. Large deposits of lime from Curdie's Inlet would soon be available to orchardists at a reasonable rate, and crushed lime would, Mr. M'Alpine thought, improve the physical, chemical, and biological condition of the land. Scientists had discovered that the soil was teeming with minute forms of life, called bacteria. The purposes these insects served in regard to the production of fruit, and their influence on bitter pit, would receive special attention. In a brief summary of the experimental work that had been commenced in each of the States there were said Mr. M'Alpine, five distinct divisions. They were associated with manuring, pruning, suitable stocks to resist bitter pit, the control of moisture, and cold storage experiments after the fruit had been gathered.—"Producers Review."

Lime-Sulphur Spray.

The Agricultural Gazette of N.S.W. reprints the following by A. L. Quaintance and W. M. Scott, United States Department of Agriculture, in Better Fruit :—

During the last few years there have been important improvements in the field of orchard spraying as regards the materials used and also in the character of machinery employed. At the present time orchardists, by careful attention to details, are able to obtain a much higher benefit from spraying operations than formerly, and while results vary, depending upon weather and other conditions, yet the successful orchardist now expects to harvest, as sound fruit, from 90 to 95 per cent. of his crop. Fruitgrowers have now become quite familiar with lime-sulphur sprays as a remedy for the San Jose scale, peach leaf-curl, and blister mite, and other troubles requiring dormant tree treatment. The lime-sulphur wash, as used on dormant trees, has gone through a good deal of evolution since the California formula was first employed in the East. Whereas a few years ago it was the practice to make the wash at home for immediate use, utilising for this purpose in many cases very large cooking outfits, the tendency at the present time is toward the employment of the commercial lime-sulphur solution, a concentrate which is kept indefinitely and used as needed, or a similar home-made solution, both of which are prepared on a distinctly different formula from the wash as formerly used. A distinct advance was made in the control of fungus diseases when it was found that these commercial and home-made lime-sulphur concentrates, properly diluted, could be used with satisfactory results as fungicides on trees in foliage, replacing Bordeaux mixture, the use of which is attended with danger of russeting the fruit and injuring the foliage, depending upon weather conditions.

— Home-boiled Lime-Sulphur Solution. —

Concentrated lime-sulphur solution, to be diluted and used for the summer spraying of orchards, may be prepared by boiling together for about fifty minutes 100 lbs. of sulphur, 50 lbs. of lime and water to make 50 gallons of concentrated solution. Any finely powdered sulphur of 98 to 99 per cent. purity may be used. The commercial ground sulphur is the cheapest form, and is as good as the flowers or flour for that purpose. The best grade of fresh stone-lime is required for the best results, although a good grade of hydrated lime may be used, provided proper allowance be made for the high percentage of moisture it contains. The boiling may be done in barrels or vats with steam or in kettles over a fire. An ordinary 70 to 100 gallon food-cooker, composed of a kettle with jacket and fire-box, is perhaps the most convenient and economical outfit for small and medium-sized orchards. Place about one-fourth of the required amount of water in the kettle, bring it to the boiling point, then put in the lime and immediately add the sulphur. Stir vigorously until the lime is slaked, then add sufficient water to finish with 50 gallons of the concentrated solution, and boil for fifty minutes. The total time of actual boiling should not exceed one hour, and as a rule a boiling period of only fifty minutes gives better results. After the sulphur has gone into the solution, combining with the lime to form sulphides, further boiling brings about a chemical change which finally results in throwing some of the sulphur out of the solution to form a sedi-

ment. The sulphur should first be passed through a sieve to break up any lumps that it may contain, and there is perhaps some advantage in working it into a thick paste with water before adding it, or the sulphur may be placed in the kettle first and worked into a paste before adding the lime. In order to finish with 50 gallons of solution the kettle should be filled to about 58 gallons, on account of evaporation. If the water evaporates to below 50 gallons, more water should be added to make up the loss. A measuring-stick with a 50-gallon mark, and other marks as desired, will be found useful in determining the amount of liquid in the kettle. When steam is used the process is about the same as above described. Owing to the condensation of the steam, a somewhat smaller amount of water is required. When the boiling is finished the solution should be poured through a strainer of about twenty meshes to the inch, so as to remove the coarse particles of sediment. It may be used immediately or stored in barrels or other containers and kept indefinitely, provided the air is excluded. In practice the fruit-growers as a rule have not been able to prepare the lime-sulphur solution without obtaining a large amount of sediment, and this has tended to make the commercial product more popular. The sediment is largely due to impurities in the lime and improper mixture and boiling. Straining will take out the coarser particles, and the remainder will not prove to be seriously objectionable. After the sediment has been settled the clear liquid should test 25 to 28 degrees on the Baume hydrometer. It takes about two gallons of the home-made preparation to equal in strength 1½ gallons of the commercial product, and these amounts, respectively, are the amounts required for each 50 gallons of spray. For the summer spraying of apple trees, lime-sulphur, whether homemade or commercial, should be so diluted as to contain 3½lbs. to 4lb. of sulphur in each 50 gallons of spray. Prepared according to the above directions, one gallon of the home-made product contains approximately 2lbs. of sulphur in solution, and therefore two gallons would give the requisite amount of sulphur for each 50 gallons of spray. For spraying trees during the dormant season it should be used much stronger, 12lbs. to 15lbs. of sulphur to each 50 gallons of diluted spray being required. For dormant tree spraying, about 7 gallons of the home-made solution in each 50 gallons of spray would, therefore, give the proper strength.

— Lime Sulphur Solution. —

For some years manufacturers of insecticides and fungicides have had on the market concentrated solutions of lime-sulphur, originally designed as treatment for the San Jose scale, which obviated the necessity of orchardists preparing the wash at home. These solutions have now come to have a much wider range of usefulness, forming a satisfactory substitute, in most cases, for Bordeaux mixture as a fungicide. These concentrated solutions for the most part are well made and are fairly uniform in strength, registering from 30 to 34 degrees on the Baume scale. Many orchardists prefer to use them rather than to prepare the spray at home. In the case of small orchards their use is doubtless advisable; but where the orchard interest is considerable, the fruit-grower might well afford to prepare the concentrate at home. In the use of the commercial lime-sulphur solution, as in the home-made solution, the orchardist should know rather exactly the proper dilution to make which will ensure the control of the troubles in view, and on the other hand not prove injurious to the foliage and fruit. Dilutions are based on the strength of the concentrate, as shown by its specific gravity. Thus commercial lime sulphur showing a density of 32 degrees on the Baume scale should not be used stronger than 1½ gallons for each 50 gallons of spray. According to the writer's observations, a variation of 2 degrees above or below the density indicated is immaterial as regards danger of foliage injury, so that the recommendations hold for practically all of the commercial concentrates on the market. Where the fungus troubles to be treated are not very serious, it is recommended that only 1¼ gallons of the concentrate should be used to each 50 gallons of spray in order to eliminate, in so far as possible, the danger of injury to fruit and foliage.

The matter of cleanliness in the dairying business is suggested the moment we think of milk and milking. Whole volumes have been written about the necessity of everything being clean about milk, because that fluid is so impressionable, not alone to tastes imparted to it by filth in solid and liquid forms, but to odors as well coming into it through the air. Cleanliness begins, therefore, in the milking yard, and is continued through the entire history of the milk,

The Farm

Draught Horse Breeding.

The demand for an article is the natural stimulus for its production, and if there is any exception to this law of political economy it is not to be found in reference to a required multiplication of any breed of domestic animals.

There have been many disheartening failures in attempts at horse-breeding, and many of these are attributable to mistakes engendered through ignorance of the science of breeding, without a knowledge of which it is impossible for any person to achieve permanent success. If the present state of our draught horses were enquired into, various pleas might be put forward in explanation of same. The low prices that some years ago prevailed discouraged the ordinary farmer from pinning his faith to the industry as a paying one, and he parted with his best mares. The industry, to some extent, fell into the hands of the squatter, and he was faced with the serious fact that idle mares are very risky breeders, and with the great mortality year in foaling, discouragement again followed, and the annual offerings of good colts in the saleyards became proportionately smaller. The great drought followed, and the industry became still more weakened.

One of the greatest fallacies observable in Australia is the attempt to correct defects by resorting to extremes, or, in other words, enforcing the idea that the mating of two animals, each having opposite defects, will result in progeny with the happy medium. One often sees a flat hoof overlooked in a stallion because the mare may be a bit straight at the ground, but imperfection of conformation, constitution, or temper cannot be so corrected. It must be very gradually corrected by careful attention to the selection of partners possessing perfect organisation to oppose defects, and calculated to ameliorate the particular fault. Recently acquired qualities are ephemeral; they are transmitted with difficulty, and destroyed by slight opposing causes. Peculiarities of form, size, colour, and constitution, with qualities, vices and defects of all kinds descend from remote generations. The law of atavism is but another illustration of the truth of the dictum that "like produces like," for when an animal takes after a remote ancestor, it is nothing else than a proof that there were enough of the elements of that ancestor in the forces at work to produce another animal in its own image, although, perhaps, long removed? The mixing of blood is like the mixing of paint—the more of the one the less of the other in the mixture, be that quality good, bad, or indifferent.

The condition in which draught colts are exhibited at shows is often unsatisfactory, and the accumulation of useless fat, without which it is ignorantly considered no animal can be in show condition, too often proves that activity, physical strength, capacity for endurance, constitution, and every other attribute desirable in a horse have been sacrificed for a development not only unprofitable but absolutely pernicious. So the tendency to accumulate fat in early life should be the last thing to strive for in an animal whose destiny is work, or the procreation of useful descendants, as early maturity in young horses is simply an evidence of over-feeding, whereby predisposition to disease, debility of constitution, and premature decay are engendered. It is not conducive to real excellence, inasmuch as there appears to be a natural law that rapid development to maturity bears an inverse ratio to the duration of mature existence. Entire horses, which have not been forced by strong food, and have been but moderately used up to five years old, remain vigorous and sound to a good old age, and such stallions have always been the best stock-getters, but in Australia a colt is a stallion when he should only be a colt, and by the time he should be a stallion he has departed this life. And the only shallow reason is that if a colt is to be placed as a three-year-old at our leading shows the best way to ensure it is to have food stuffed into him unstintingly so that he appears before the judges shaking at every step in his blubber. In regard to cattle, the amount of fat daily put on a bullock is both interesting and instructive, and it would be well if similar information regarding horse stock could be obtained, between the last day of entry and the day of exhibition, just to show how it should not be done.

One of the most apparent mistakes observable in Australia is the using of colts at a too early age. This is most detrimental to their development, as their constitutions are debilitated by the stimulating diet to which they are treated, to enable them even to attempt to perform their assigned functions. In getting up a stallion for his duties, condition is all-important to his procreative powers, and this can only be acquired by judicious feeding and a reasonable amount of exercise,

Good feed is necessary, but anything tending to obesity should be checked, as a soft lymphatic temperament is unfavourable to the best fulfilment of the procreative functions; and moderate condition is also desirable in brood mares, as excessive leanness implies irritability of temper, poverty, or the existence of some disease; while the reverse is just as undesirable, as the former prejudicially influences the nutrition of the foetus and deteriorates the subsequent secretion of milk. The latter predisposes to abortion and difficult labours. The first sort are generally found in mares that have been worked up to 10 to 12 years in towns, and then set apart for breeding. They are seldom sure breeders, and never good ones, as by the maintenance of hard stable feed condition for a prolonged period they are rendered prone to sterility; and, if got in foal, they are apt to experience difficulties in labour, owing to the various strains they may have received during an arduous lifetime. Some, especially old mares, or those subject to very heavy work, elaborate in milk, a fluid deficient in nutrition—a circumstance rendered evident by the condition of the foal, which generally becomes wasted. The other class of mare that gives trouble is the showyard type, as, by reason of her high condition, she is prone to sterility, and even if stinted experiences difficulty in foaling. Her stock are never as strong and good constitutioned as those of her sister that wears the collar, and there is no remedy except moderate work and plain living. But the injury is generally done young by over-feeding, and they remain sterile all their lives. Brood mares must be worked if anything like satisfactory results are likely to be got from them.

A stallion that is required to provide heavy draughts must himself be weighty, masculine all over, and close to the ground. A practical eye can take in at a glance symmetry and form, while action is as much the test of their structure as the free and easy movements of the flywheel of an engine, which has been fitted in every part with mathematical skill and precision. The general conformation of a colt will, as a rule, be a guide to his movements long before he ever lifts a hoof at all, as we know to expect short steps in front from a horse with proppy shoulders and a crutchy, shallow pastern and hoof. In short, a horse that moves up to expectations is that one which has a deep shoulder well set for his collar, with the outline of his shoulder indicating a slope of freedom for his forearm, which, laden with muscle, sends the knee well to the front in grand swinging fashion, and brings his body well over his hoofs. With powerful loin and quarter, lengthy and muscular thighs, clean, well-shaped and well-knit hocks he will swing along with a regular pendulum-like movement, and never seem to care for his load behind him. Close, straight action with the knees and hocks, well flexed on a sound built horse tells well on the road out and the road home, and, when his course is run, he walks to the knacker's yard broken in spirit and worn in the body, but moving as well fore and aft as he did when he first donned his harness.

Construction of a Septic Tank.

There are numberous ways for building septic tanks. Such tanks may be built of any tank material, but for durability it is preferable to construct them of brick, stone, or concrete. The partitions may be built of concrete or wood. It is generally advisable to build them of concrete if convenient to do so. The tank should be built as nearly air-tight as possible, with a slight vent of one-half inch pipe to allow the gas to escape. There should be a trap-door in the first compartment so as to allow the same to be cleaned when necessary. The partition should be built in such a way as to allow the water to be taken from the centre of the tank, where the sewage is all liquid. The most of the solid particles of sewage either sink or float; consequently, by taking the sewage from the centre of the basin only such liquid and particle as are of a semi-solid nature, or have the same density as water, are discharged into the second compartment. Decomposition is carried on still further in this compartment. When transferred to the third compartment, it should be thoroughly liquefied. When transferred to the fourth compartment, it is ready to be deposited into the irrigating system, where it is to be taken up by the soil. If the sewage is not to be utilised for irrigating purposes, but drained directly into a stream, the sewage may be taken from the top of the tank. In case the tank is to be cleaned, the plugs of the same systems may be removed and thoroughly drained. For irrigating purposes it is advisable to use a syphon. This syphon removes the water from the last compartment of the septic tank automatically at intermittent discharges. The discharge at one time of a quantity of sewage large enough to fill the irrigating system will scour the system of pipe; besides it more uniformly distributes the sewage throughout the whole irrigating system. Without a syphon, on pulling the plug occasionally the same effect can be secured but if the sewage is allowed to overflow into the tile it will run out into the soil nearest to the septic tank. In the latter case the soil will become oversaturated with the liquid, and the purification of the sewage in the soil is thereby rendered imperfect.

— Sewer Connections to Septic Tank. —

Sewer connection from the cow barn to the septic tank should be constructed of not less than five-inch glazed sewer pipe, and preferably six-inch pipe. The sewer should be connected directly with the gutters and allowed to enter into a trap. This trap is a small box, in which a pipe bends down into the liquid to prevent the gases or odours coming from the septic tank from going into the stable. Similar traps should be put in when connected with the gutters of a creamery or cheese factary, or to the house or dairy house on the farm. The diameter of the sewer pipe from the house need not be more than four inches, and may connect with the same tile as that coming from the dairy barn.

— The Size of Septic Tank and Irrigating System. —

The size of the septic tank depends somewhat upon the amount of sewage run through the tank and the consistency of the sewage. For average conditions the last two compartments should hold the average discharge in twenty-four hours, and the irrigating system should be of equal capacity to hold the sewage from this compartment. However, the larger the tank the greater will be the chance for the organic matter to thoroughly decompose, and at the same time the irrigating system can be of greater capacity, irrigating a larger tract of land.—" Farmer and Grazier."

Early Emasculation.

Some owners of colts are having them castrated as weanlings, or even when suckling their dams. They claim that by thus early emasculating their stock there is no loss from the operation and an improvement in the animals operated upon. The alleged improvement consists in docility and early maturity. We protest, earnestly against this practice for, to our mind, it is based upon error. The colt cut as a sucker cannot be expected to develop as strong a body as the one left entire until two years of age. He is liable to have small bones, weak muscles and stunted frame, and, besides this, his head is effeminate and weak looking. In other words, his appearance corresponds to that of a steer compared to that of a bull. In the latter animal the effects of castration are more markedly apparent than in the horse, but the same truth holds good with both—they are almost equally changed in appearance by the effects of the castrating knife. With colts it is, in our opinion, possible to strike a happy medium between the lordly crest of the mature stallion and the more effeminate neck of the gelding. If the colt is cut too soon his whole appearance becomes too weak looking. If, on the other hand, it be delayed too long, the horse is a "stag," and altogether too thick in the throat latch, and will also be apt to tease mares and prove vicious or uncontrollable under exciting circumstances. In order to retain a sufficiency of masculinity with its corresponding appearance, we think that colts, as a rule, should be cut not earlier or later than two years of age, and if the operation be properly performed there is very little danger at this age. By that time of life the colt has made rapid development, and is strong and lusty, but has not yet acquired the crest and thick throat-latch of the mature horse. There is just sufficient "he" look about the two-year-old colt to make him a good gelding, and he should now be altered at once, but as a general rule his stallion propensities will not be strongly in evidence before two years of age.

With cattle it is altogether different. The steer is to be kept for fattening, and not for work. His appearance is better to be effeminate in that it indicates quietude of disposition that will make the feeding process an easy and satisfactory one. The bull calf should be cut earlier with this point in view, for, unlike the horse, he develops very fast and will soon acquire all the characteristics of a mature bull, and, if cut later, will be regarded with suspicion when he goes to market, for buyers will be apt to think that he was very recently "bull beef." Such animals do not bring the price of the early altered ones. With cattle, sheep and swine there is another good reason for castrating young, and that is that the operation, if delayed, might lead to a loss of calf, lamb or pig flesh, and every breeder knows that this early growth once lost is very difficult to regain.

Lambs should be castrated at fourteen to fifteen days old; calves

at about one month or six weeks; pigs at one month, and colts, as a general rule, at about two years of age. Further, it may be added-ed, that they should be castrated when the weather is favourable.—A. S. Alexander, V.S., in "Live Stock Report."

Prevention is Better than Cure.

The manager of a butter factory has sent the following circular to his suppliers with excellent results:—

To try and prevent cream from going bad is better than trying to cure it after it has gone bad.

1. See that your cans are properly cleaned; if not, let me know at once.

2. See that your separators and buckets are perfectly clean, and also that there is no smell where you separate and keep your cream.

3. Never mix warm cream with cold cream; see that both are kept separate until cool before mixing.

4. Never keep the lids on the cans. Give the cream plenty of fresh air, stir it up once or twice, and keep a clean muslin cloth over it to keep out dirt.

5. If sending by train never take it to the station three or four hours before train time, and leave it with the lid on.

6. Dissolve a little saltpetre (a teaspoonful in a little cold water) and add to ten gallons of cream. It will help wonderfully in preserving it.

7. Send your cream as often as possible to the factory.

8. Separate twice daily if possible, if not, every morning, as the milk will keep better during the night.

9. Never stand cream in water after it has become warm and stale; get fresh cold water.

10. Always try and run your separator so as to skim not more than one gallon of cream out of twelve gallons of milk.

Washing Pigs.

Pigs glory in wallowing in the mire, and the most filthy holes provide them with conditions which appear to give them the greatest delight (writes "Cambrian," in the "Farmer and Stockbreeder"). Some assume that when they roll in the mud they are desirous of getting dirty. I am not so sure of this. Judging from what I have seen, the reverse seems to be the case. No pig I have ever owned has gone on enjoying having a crusty coat on any part of their body. When hampered with such they soon rub and scratch with the object of getting it off, and they find peace and relief in this. I believe they often take to the mucky mud holes to roll and get the hardened coats softened. I have always noticed that a pig with a thick layer of dry dirt on it will roll in the slush much sooner and more often than one that is clean, and I have satisfied myself by practice that pigs that are kept clean are more contented and thrive much better than those that are always on fidgets with an irritating coat. In warm weather they will rush into the pools and streams and have a bath, but there is nothing objectionable in that. How they do enjoy a good scrub! and they almost seem to take a pride in avoiding dirt afterwards, but the clean skin no doubt does not suggest a return to additional filth. I would urge that all pigs be scrubbed occasionally. Use a liquid composed of one gallon of hot water, half a pint of paraffin oil, and two ounces of soft soap, when all parasites will be killed, dirt removed, and clean, sweet skin supplied. Extra feeding may cause pigs that have come to a standstill to develop more freely, but I can say a good wash whenever necessary will move them on wonderfully.

About Goats.

This animal is not regarded with much respect in Australia, particularly the common sort. It is different in older countries, especially in France and Belgium. In both these countries for some years past efforts have been made with some degree of success to give the goat a higher rank of distinction at agricultural exhibitions. According to some recent French figures the goat is a much more valuable animal than we are accustomed to regard it.

Goats are principally confined to the mountainous regions of the Old World, where they are found throughout the South European region, from Spain to the Caucasus, thence through Armenia, and Persia, to the Himalayas and China. In Australia we assaciate them with suburban streets and vacant allotments, where they act as scavengers of the rubbish tips, and have been seen eating the advertising posters off a galvanised iron fence. In such cases the unfortunate goat is the creature of circumstances, and is withal the poor man's friend.

Writing about it, an authority says :—

"Notwithstanding the fact that goats are mountain-loving animals, climbing and leaping with extraordinary dexterity, it cannot be accepted as correct that, as is often believed, the males of certain species are so very dexterous as to be able, when falling from a height, to save themselves by bending the head forward and alighting on their massive horns. Like the numerous exaggerated stories current in regard to that faithful creature, the dog, it might be said that the story in question must have been at first circulated by an over-enthusiastic admirer of the goat. That they are somewhat destructive cannot, of course, be denied, for young shoots of trees, etc., suffer considerably by their presence. It may not, however, be generally known how highly developed are the senses of sight and smell possessed by the goatl; and for keenness and adaptability and climbing they deserve special mention. As to their general intelligence it may be observed that Romanes mentiones the case of one ringing a door-bell when it was hungry and wanted its dinner ; and two instances are on record of the intelligent behaviour of two goats when they were brought face to face on a rocky ridge, when one walked over the other, this being the only means of extricating themselves from their perilous position.

That the goat is a very useful animal is already well known, and the value that it represents, the important services it renders in certain countries, its production of kids and skins which are so highly prized in leather-dressing, the meat that it supplies, the cheese and milk obtained from it—all these deserve mention, though they are so well known that it would be superfluous to dwell upon them.

To turn our attention for a moment to France, it is not without interest to observe that, according to recent statistics, not less than a million and a half goats exist throughout that country, where good profit is realised on them by their owners—a fact which should not be overlooked in this country. It should, however, be mentioned that, owing to improper selection, the French goat as a rule produces rather poorly as compared with most of those of Switzerland. The French goat yields on an average from about 3½ to 5¼ pints of milk daily, 8¾ pints being the maximum, which is never exceeded ; Alpine and Nubian goats, however, give 8½, 10½, and even 12 pints of milk daily.

According to some recent French French statistics contained in the "Journal Officiel," it is seen that the productive power of a gaod Fribourg cow will reach 2,900 litres per lactation (a litre being, roughly, 1¾ pints), that of good small Brittany cows attaining 2,060 litres. On the other hand, good Normandy and Flemish species may yield 4,000 litres of milk in ten months, the duration of their lactation. It is not without interest to mention that a goat will consume, according to whether it is of Swiss or Spanish breed, one-sixth to one-eighth of the forage necessary for maintaining a good-sized cow. According to experiments carried out by no less an agricultural authority in France than M. Crepin, the goats of Saanen, Toggenbourg, Gruyere, and Haut Valais yield, when in good condition, from 900 to 1,800 litres of milk during a milking period of ten months. It, therefore, follows that six good Swiss goats, consuming the same quantity of food, and worth, together, about the same price as one good cow, will give 5,400 to 6,000 litres of milk during a year's milking. These figures certainly are in favour of the goat, though to secure similar results it would be necessary to give the same care and attention to the goat as is bestowed upon the cow.

As to goats' milk, it may be said that, like that of asses, it presents a chemical composition almost identical with human milk ; for we have it on the authority of Dr. Bourard that it differs only in being a little heavier and by possessing a slightly greater quantity of saline matters. Owing to its density, it is more tonic, and by virtue of the salts it contains it favours dental evolution and the development of the bony system. What is also very important, the purity of this milk, owing to its being free from the germs of contagious diseases, make it an admirable food for children, for it is generally agreed that the goat is practically immune from tuberculosis.

In Australia we have thousands of acres of land at present lying waste, not sufficiently good for cattle or sheep, but fully capable of maintaining the hardy goat, which can withstand the hardships of drought better than any other animals. We would like to see more interest taken in it, and experiments on a large scale carried out, with the view of testing its value in this country.

— Goats as Wet Nurses. —

Mr. Maurice Steiner writes us as follows :—

In view of the hostility shown to the goat in some quarters, and its unpopularity as a useful do-

mestic animal, I have much pleasure in handing you the following translation from "Kneipp Blatter," April 20th, 1907:—

"A Parisian surgeon, T. Doudard, recently published a book entitled La Chevre Nourrice. In it he proclaims the goat as the wet nurse of the future, and the best and most comfortable wet nurse at that. There is no danger of the goat spreading contagious diseases, and she is immune from tuberculosis. Goats' milk is of uniform quality, easily digested, cheap in comparison to cow's milk, and can always be depended upon, as she is willing to yield it day or night. These are the qualities, states Dr. Boudard, that commend her as a wet nurse, and with her advent will disappear the less valuable substitutes now used in artificial feeding. Such a trained goat in full milk can be bought at 100 francs (£4), and its monthly cost is 15 francs (12/6)—that is in Paris. What is this compared with the cost and annoyance of human wet nurses? The goat is a good and sensible animal, and there is a variety of white Cashmere goats whose milk is almost free of any smell, and has got no horns. It would be well in the interests of humanity to make known the usefulness of the goat as a wet nurse. Its real destiny is to replace the old degenerated cow as a milk supplier for infants."

In view of the foregoing statements and the often raised outcry about our infant mortality through the bad milk supply, I would suggest that some enterprising farmer start a goats' milk supply dairy, combining a hiring out department for well-trained animals, as indicated in the article just quotedf It would in all likelihood prove a remunerative business, and save many valuable innocent infants' lives, to the glory of Australia.—"Farmer & Grazier."

Mendelism.

Though a great deal has of late years been written on this subject the personality of the originator of this theory of inheritance has not been prominent in the literature of the subject.

The following short descriptive account from a recent issue of Horticulture will be of interest to many who have been interested in the theory propounded by the Austrian Monk. It can be safely said that the correctness of the principles of the Mendelian theory of inheritance has been proved, but there is yet a vast amount of experimental work to be done before it becomes a practical factor in the work of the ordinary every day horticulturist or stock breeder.

The author of the article in Horticulture writes as follows:—

Although much has been written these last few years in regard to Mendel's law and by this time nearly everybody has heard about it, there are really few persons who can say that they are acquainted with the life history of the discoverer.

Bateson, who has probably done more than any other searcher to popularize the theory of Mendel's law, has also applied himself with infinite love and sacrifice to the collection of all the available data pertaining to a life history of Gregor Johann Mendel ("Mendel's Principles of Heredity"), Cambridge, 1909.

Johann Mendel was born July 22nd, 1822, in Heinzendorf near Odrau in Kuhland, a province of Austrian Silesia. Heinzendorf, so to speak, represents a small island of German population, surrounded by Slavs.

From his father, a small tenant farmer, Mendel early learned the art of grafting. His uncle on his mother's side, who seems to have been an intelligent man and who did much for the education of children by endowing special classes of instruction at his own expense, helped little Johann along in his earlier years at school. In the village school Mendel showed such intelligence that he was sent to a better school at Leibnitz and later to the high schools at Trollau and Olmuetz. To cover the expenses of this education, Mendel was obliged to accept the help of his sister who sacrificed part of her dowry and for this act of kindness Mendel felt himself indebted to his sister for the rest of his life.

Through the influence of one of his teachers who was an Augustine monk, Mendel, after completing his high school term, became a candidate for admission to the Augustine cloister of St. Thomas (King's cloister), in Bruenn. He was given the name of Gregor and appointed to educational work. In 1847 Mendel was consecrated priest and sent to the University of Vienna from 1851 to 1823 at the expense of the cloister. He applied himself to the study of mathematics, physics and natural history, after which he taught at the polytechnical school of Bruenn until 1868 when he was elected Abbot or Prelate of the King's cloister.

While still a novice at this cloister, Mendel had already begun his experiments in hybridization on the plants in the large garden of the cloister. From these experiments his name was to become famous all over the world. After eight years of painstaking and intellugent research into the field of heredity, conducted through generation after generation of garden peas, Mendel was convinced that he had solved the problem of heredity and submitted the result of his labours to the "Society of Natural History" of Bruenn in 1865. But his efforts found no consideration with this body, nor after publication, did he meet with any better success in the sessions of similar societies elsewhere. His publications in regard to "Hieraclium Bastards" met the same fate. Mendel also experimented with bees, but unfortunately his observations in this line, which were published under "Bee Cu,-ture," have been lost.

The appointment to the prelacy put an end to the scientific researches of Mendel. The fifteen years before his death were filled with the work of his position, more so as he applied himself to fighting a state law, exacting, in his estimation, unjust duties of his cloister. These laws were eventually abolished shortly before his death. This struggle at law changed Mendel from a man of a jovial and friendly disposition into a bitter and mistrusting misanthrope. His health began to fail and he died of Bright's Disease, January 6th, 1884.

Mendel was a man of great energy. He published regular meteorological reports and observ-

(Continued on page 364).

Common Faults Found in Butter Factories.

(By a Victorian Factory Manager)

It is fully recognised that a butter factory must have plenty of ventilation and light, the floors and drains must be impervious, as leaking floors are a source of grave danger., Corners, crevices, and all rough surfaces should be abolished. If a factory is ill ventilated it soon acquires an undesirable taint ; if ill lighted it favors the growth of undesirable bacteria and moulds, as also do uneven surfaces, crevices, and corners, all acting as lodgments for dust which contains numbers of bacteria, which are carried to the different products in course of manufacture in the factory. The floors and drains if in a leaking condition convey mischief right through the building by the soakage becoming tainted and giving off disagreeable odours when the air should at all times be the sweetest and purest. Many factories have suffered considerable loss through the drainage getting into the water supply and other places ; thereby a continuous propagation of undersirable organisms is set up and conveyed through every part of the factory. On one occasion I found the butter milk tank leaking, and the soakage going direct to the water supply for washing the butter. I have seen the floor of a butter factory raised where the soakage had polluted the ground under the floor to a depth of nearly two feet. I have also found factories where candle or other light was necessary in order to see in cream and churning rooms.

The engine is often over taxed, and run at a high rate of speed, which causes considerable wear and tear on the brasses, and if they are not attended to the result is extra wear of crank and brasses. Sometimes the packing is left in the glands too long, and the perished packing soon scores the piston and other rods. I have on several occasions heard the engine knocking fully one hundred yards from the factory, also steam leaking through the valves and glands, thereby entailing extra expense by requiring more fuel and attention in stoking to keep steam up. The boiler, taps and valves are found leaking for want of attention in grinding in, and the firebars continually burning out through the neglect or ignorance of the boiler attendant, who never thinks of cleaning the bars or removing the ashes often enough to allow the air to keep the bars reasonably cool. Trouble in the engine room is caused by the short sighted policy of the directors, who retain the services of an incompetent engine driver, etc., or offer such low wages for the position that no competent man would accept.

The cream pump is very often neglected, and the plunger when removed furnishes sufficient evidence in the deposit round the plunger to show that it is not removed to wash it. This state of things in regard to the cream pump must play a leading part in lowering the quality of the manufactured article by contaminating the whole of the cream that passes through the pump and pipes. Similar want of attention is noticeable in the buttermilk and skim milk pump. By removing the valves and plungers, and giving all parts a good application with soda solution with the aid of a scrubbing brush, effectively prevents the troubles referred to. I have known the plunger to remain in the barrel of the pump during the whole of a season without being taken out once. On one set of milk pipes, I found a coating over quarter of an inch thick, and the manager admitted that it was not washed for many years. Complaints were also frequent re the inferior butter made from that particular cream. The inside of the separator frame where the top bearing is fastened is sometimes found giving off a very offensive smell on account of the fluid in the bowl over-flowing, and allowed to remain when the bowl is being removed from the frame after separating. Separators are often too hurriedly set going, and as a result of such the machine is knocked out of balance and considerable damage done to it and expense incurred in the replacing of belts, new spindles, etc., when by taking a longer time in getting separator to speed would reduce this unnecessary expenditure, as well as reduce the time devoted to trying to keep the machine running well.

— The Pipe Cooler. —

The two trays on top are fitted so close together that they cannot be thoroughly cleaned unless taken apart. Unfortunately, this is neglected in some factories. Then again the milk vats and skim milk vats are sometimes neglected, and a yellow deposit is found on the insides, being a good breeding ground for undesirable bacteria, which are conveyed to the suppliers' cans, and if there is any neglect at the farm, then the fresh milk is contaminated before it reaches the factory. Rusty cans should be discarded, for if used for

cream, a tallowy butter is usually the result in butter made from cream in rusty cans; this happens even when the tin is worn off also.

— Churns and Butter Workers. —

In a number of cases churns are found with a distinct taint through not being properly washed and aired. The rubber or cork around the lids is allowed to become foul. With some churns, if you examine the inside ledge, an accumulation of cheesy material is met with; also the bottom is allowed to become tainted, and the iron tray which conveys the buttermilk to the receiver is saturated with a slime which gives off an unpleasant odor, and the quality of the butter is thereby injured.

Butter Worker.—Often we find the greasy worker, the furred worker from which greasy butter is produced, also the tables and beaters are found to have openings in them, and if examined with a knife, a greasy compound, mingled with rust, is brought to light. This deposit is distinctly rancid and tallowy, and causes further contamination of butter. One butter worker at a factory where two were used was left idle, and in a short time the quality of the butter made there improved, and on careful investigation the cause was distinctly traced to the disuse of the butter worker.

A great deal of trouble is caused by using imperfect or worn out scales, as butter very often comes forward with a range in weights of 55 lbs., 56 lbs., and $57\frac{1}{2}$ lbs. As lines such as these have to be checked, considerable trouble is entailed, where the trouble of replacing worn-out scales and the adjustment of good ones would cause this latter trouble to disappear. Sometimes too many nails or too few are used in the nailing up of the boxes; eight are sufficient, about $1\frac{3}{4}$ inches long. I have seen 14 to 16 nails $2\frac{1}{2}$ inches long in the lids of some boxes of butter. In cleaning walls, and ceilings, great care should be taken to do it effectively. The walls and ceilings could be sprayed with formalin solution after being thoroughly washed and then lime washed if of wood or stone or plaster. The utensils, churns, etc., should be freed from grease, and thoroughly washed with boiling soda solution, after which the wooden portion of the plant can be sweetened by a good scalding with boiling water, to which lime has been added.

Partly churned cream is often added with the rest, and when churning is completed specks are to be noted right through the mass. Such partly churned cream should be kept apart. Putting water in at too low a temperature in order to firm the butter up chills the outside of the globules, and when on the butter table the salt does not take properly; also shaking the salt on unevenly and not working sufficiently has the same effect. These defects cause an irregularity in the color, defined as streaks or mottles. Rinsing the cream can and vats with warm water when loading the churns should not be tolerated as a greasy butter is usually the result. When butter milk is being drawn off, sometimes sufficient time is not given for it to drain from the butter before the washing water is added, and as a result the moisture in the manufactured article shows cloudy and milky. As butter showing the latter fault quickly goes off in quality, such fault should be remedied. Also some attendants never vent their churns during the churning process, neither do they wash it down when "breaking," both points which certainly should be attended to.

The ceilings and walls I have sometimes seen with splashes of cream and small pieces of butter adhering to them, and in a short time spore bearing moulds are to be found growing there, and the undesirable growths are wafted hither and thither in the same manner as particles of dust, and are conveyed to the cream, and also gain access to nearly all the utensils and rooms throughout the factory. Suddenly the quality of the output goes "off," and a considerable loss is faced by the factory from such a small beginning as this by the butter becoming very irregular in quality, buyers being afraid that it is carelessness in the daily manufacture.

The points mentioned in this paper have come under my notice during my many years as a butter factory manager. I do not for one moment wish to infer that the faults here pointed out are general, or are allowed to continue under the supervision of those old and experienced managers who by their skill and ability and watchfulness, have gained and maintained the high standard of excellence of the butter of Victorian manufacture, but as the old and experienced managers, finding their services not being amply rewarded, are turning to other channels in the hope that their intelligence and capabilities may be justly valued and appreciated, new managers are coming forward to take their places, and it is in their interests, and the interests of the dairying industry, that I have placed my observations on paper in the hope that the faults alluded to will not be allowed to get a foothold in the factories under their control.

(Continued from page 361).

ations on sail spots. He was presiding officer of the "Mortgage Bank of Maehren" and a celebrated chess player. His home town, Heinzendorf, is indebted to him for the installation of a fire department.

The fact that Mendel's discoveries, which are so plain and which have been so universally verified, could have been so long overlooked and neglected, is almost inexplicable, more so as Mendel corresponded with Naegely, the great naturalist and acquainted him with his investigations. Already in 1861, the French Academy had offered a prize for a paper on plant hybridization. Well-known naturalists and scientists of the time busied themselves with the problem and came near solving it, without, however, being able to clearly demonstrate the principle.

Bateson is of the opinion that Darwin's epoch-making theory, which at that time revolutionized all the views of the scientists and which was regarded as solving all questions in regard to heredity, has been responsible for the distracting of attention from researches in this particular line. Darwin's theory really stopped all efforts for a long time. We can hardly realize to what extent Darwain might have been affected and how his theory might have been shaped entirely different if Darwin himself had been aware of Mendel's discovery. As it is, it was only a short notice in Focke's work on "Plant Mongrels" (1881), which in 1900 led to the discovery and verification of Mendel's work and papers by De Vries, Correns and Tschermak.

From this dates a new era and when Mendel said, as he did, "My time is sure to come," he built his hopes upon a sure foundation. Sure, it was fifteen years after his death, but his time has come. Mendel was very much ahead of his time, but he has proven that diligent application to one's ideals will in time be fully appreciated.

What Forestry Has Done.

By Treadwell Cleveland, jun., Expert, Forest Service, Department of Agriculture, U.S.A.

Forestry is practised by every civilised country in the world except China and Turkey. It gets results which can be got in no other way, and which are necessary to the general welfare. Forestry is not a new thing. It was discussed 2,000 years ago, and it has been studied and applied with increasing thoroughness ever since.

The principles of forestry are everywhere the same. They rest on natural laws, which are at work everywhere and all the time. It is simply a question of how best to apply these laws to fit local needs and conditions. No matter how widely countries may differ in size, climate, population, industry, or government, provided only they have, forests, all of them must come to forestry some time as a matter of necessity.

The more advanced and progressive countries arrive first and go farthest in forestry, as they do in other things. Indeed, we might almost take forestry as a yardstick with which to measure the height of a civilisation. On the one hand, the nations which follow forestry most widely and systematically would be found to be the most enlightened nations. On the other hand, when we applied our yardstick to such countries as are without foresrty, we could say with a good deal of assurance, by this test alone, "here is a backward nation."

— France. —

The sand dunes on the coast of France, mainly in Gascony, which the winds drove farther and farther inland, wasting the vineyards, have now largely been fixed in place by forest plantations, which were begun in 1792. Of the 350,000 acres of sand dunes, 275,000 have been planted in forest, and the dunes, instead of being a constant menace to the neighbouring farmers, now are growing crops of pine which produce valuable wood and resin. In all, about £440,000 was laid out in bringing the forests under administration. Now, though about one-half of the lands have been acquired by private persons, and the State retains only about 125,000 acres, the State has received £24,000 above all expenses, and possesses a property worth £2,000,000, acquired virtually for nothing in addition to this. Some 2,000,000 acres of shifting sands and marshes toward the interior of the country—a triangular territory, known as the Landes—have been changed from a formerly worthless condition into a profitable forest, valued at £10,000,000 Reforestation was begun about the middle of the last century.

La Sologne, in the central part of the country, between the Rivers Loire and Cher, was once densely wooded, but was for two centuries steadily deforested. By the beginning of the 19th century 1,250,000 acres had been utterly abandoned. Owing to the nature of the soil subsoil drainage was necessary as a first step toward reclaiming this land with forest. About the middle of the 19th century a committee of private citizens, under the presidency of the director-general of forests, began the work of reclamation. A canal 25 miles long and 350 miles of roads were built, and 200,000 acres of non-agricultural land were planted with pine. In spite of the fact that one of the species planted proved a failure, and another kind of pine had to be substituted, the reforestation work has resulted in a forest property worth £3,600,000, and land which could be brought for 4 dollars an acre 50 years ago is now yielding 3 dollars an acre net annual profit. The arid limestone wastes of the province of Champagne have been partly reclaimed by forest planting. Two hundred thousand acres, planted at a cost of £2 per acre, have now risen in value from 16/- per acre to £8 per acre, with a total value of £2,000,000, and a net revenue of 2 dollars per acre.

— Germany. —

German forestry is remarkable in three ways. It has always led in scientific thoroughness, and now it is working out results with an exactness almost equal to that of the laboratory. It has applied this scientific knowledge with the greatest technical success, and it has solved the problem of securing through a long series of years an increasing forest output and increasing profits at the same time. Like other advanced European countries, Germany felt the pinch of wood shortage 150 years ago, and though this shortage was relieved by the coming of the railroads (which opened up new forests), and by the use of coal

(which substituted a new fuel for wood), the warning was heeded, and systemaric State forestry was begun. After all, the scare was not a false one, for even to-day Germany is not independent as regards wood, since she has to import one-sixth of all she uses.

In addition to the wood-supply question, Germany was forced to undertake forestry by the need of protecting agriculture and stream flow. The troubles which France was having with her mountain torrents opened the eyes of Germany to the dangers from floods on their lands. As a result the maintenance of protective forests was provided for by Bavaria in 1852, by Prussia in 1872, and by Wurtemberg in 1879.

What, then, has forestry done in Germany? Starting with forests which had been recklessly cut over, it raised the average yield of wood per acre from 20 cubic feet in 1830 to 65 cubic feet in 1904. During the same period it trebled the proportion of sawn timber got from the average cut; which means, in other words, that through the practice of forestry the timber lands of Germany are of three times better quality to-day than when no system was used. And in 54 years it increased the money returns from an average acre of forest seven-fold.

— Switzerland. —

Forest regulations came very early in Switerzerland. The first forest ordinance of Berne was issued 600 years ago. The city forest of Zurich, famous as the Sihlwald, has been managed under a working plan since 1680, and is to-day one of the most perfectly managed and most profitable forests in the world. It yields, on the average, a clear annual profit of 12 dollars an acre. From time to time, as the evidence shows, the Swiss people stood in dread of a timber famine. Ordinances were passed forbidding the reduction of clearings, and the exportation of wood from one canton to another. In the middle of the 18th century, as modern industrial life began, various cantons sought to follow the examples which Berne and Zurich had set in forestry. A severe flood in 1830 brought home the need of more vigorous measures in guarding against torrents. The floods of 1834 and 1868 further enforced the lesson. An investigation of Swiss forest conditions was ordered by the Bund in 1857; and the same year provision was made for an annual appropriation of £400 to the Swiss Forestry Association for engineering and reforesting work in the Alps.

To sum up, forestry in Switzerland, where every foot of agricultural land is of the greatest value, has made it possible for the people to farm all land fit for crops, and so has assisted the country to support a larger population, and one that is more prosperous than would be the case if the valleys were subjected to destructive floods. In a country as small as Switzerland, and one which contains so many high and rugged mountains, this is a service the benefits of which cannot be measured in dollars. It is in Switzerland, as in the Sihlwald, that forestry demonstrates beyond contradiction how great a yield in wood and money it may bring about if applied consistently for a number of years.

— Austria. —

Forestry is successfully practised on 60 per cent. of all the Austrian forests and on 82 per cent. of the private forests, and excellent results have been secured by co-operation between the State and private persons in forest management, particularly under the law of 1883. The most conspicuous fruit of Austrian forestry, however, is the reforesting of the "Karst." The Karst was a stretch of barren lands in the hilly country of Istria, Trieste, Dalmatia, Montenegro, and neighbouring territory along the shores of the Adriatic Sea. It comprised some 600,000 acres. For centuries it had furnished the ship timbers and other wood supplies of Venice, but excessive cutting, together with burning and pasturing, the evil results of clearing, and the natural condition of the land, had left it a waste almost beyond recovery. Many laws had been passed from time to time to stop the forest havoc, but without real effect till 1865. In that year the Government, persuaded by the Forestry Association, began to offer help to landowners who would undertake forest planting. At the present time over 400,000 acres, or two-thirds of the Karst, have been brought under forest; in part by planting, at a cost of from 8 dollars to 10 dollars an acre; in part by protection and the natural recuperation so made possible.

Experimenting by Farmers.

The old-time hostility by some farmers toward advice in agricultural work by chemists is fast dying out (writes "Practical" in the "Farmer"). Now men, particularly the younger men, are beginning to appreciate the value of scientific research, especially in the domain of chemistry; and not the least appreciative are those who make their living by agriculture. They are coming to realise that to the chemist they are more indebted than to any other; for chemical research has given to them the inestimable boon of artificial manures in a highly concentrated form. We are indebted to the chenist for the discovery of finely ground bonedust, superphosphate, and basic slag as concentrated phosphatic manures. The late Sir J. B. Laws was the first to embark on the manufacture of superphosphate on a commercial scale, the great German chemist, Liebig, had also, by independent experiment, discovered the value of treating bones and other phosphates with sulphuric acid and so producing superphosphates. Other chemists, contemporaries of these two great men, also directed their energies to the advantage of farmers. Thomas and Gilchrist, I believe, first discovered the value of that by-product of the steel works, basic slag. All these discoveries were the result of profound thought and study by men who were not only enthusiastic in their work, but who freely gave to the public the results of their labors. There is no short cut to success in anything; true, a discovery in mechanics, or a new invention in machinery, may in a moment revolutionise certain kinds of manufactures, and immediately double or treble the gross output, but increasing the yields of crops is a much slower process, and involves much care, consideration, patient experiment, and investigation.

Farming is really a scientific occupation and the sooner those engaged in it realise this fact the better it will be for them. Some men are so fortunate as to possess land that only requires to be ploughed and sown to give good crops; but these are few compared with the great number who have to produce good returns from inferior and unpromising land. In such cases the knowledge of the trained agriculturist is the great factor in achieving success. Now, while the skill of the chemist is of great assistance, it is not everything that goes to make success; for chemical theories do not always come out according to rule when applied in practice. The old maxim that an ounce of practice is worth more than a pound of theory is perfectly true, and it is here that a practical farmer can give great assistance to the scientific man of theory; the combined work of the two tending towards success, both striving to overcome adverse conditions and enlist Nature on their side.

Though I have said that farming is becoming more and more a scientific occupation, it does not by any means follow that every farmer should be a highly trained scientist—such is not possible; but it is quite possible to bring business acumen to bear upon this occupation as upon any other. Just here is where the value of experiment comes in; the scientist propounds the theory and the farmer puts it into practice; both compare results; if not satisfactory, modifications of the experiments are tried, until finally some measure of success is attained. A skilled analytical chemist once put it to me very tersely in these words: "Put the question to the soil and you will get an unfailing answer"; in other words, try the various manures alone and in various combinations according to soil and crop. Besides these, however, there is the question of climate, for it is admitted that climatic influences have as much to do with the success of the crop as manures. Then again comes up the problem of different combinations of fertilisers for the various crops. Mangels, for instance, require more potash than soft turnips, and the latter more than swedes. Analysis of the ash of these roots revealed this fact; this was followed by the application of this manure in varying quantities until a fairly accurate result was achieved in each case. Small experimental plots are easily arranged, say, each half a square chain, which is one-twentieth of an acre, and on each plot phosphates, nitrogen and potash alone should be tried, then various combinations of two, and finally all three combined; in all cases there should be one plot unmanured; the crop should then be weighed, and the produce of each can then be compared with the others. This is not the most complete method of ascertaining the full value of any manure or combination of manures, for there still remains the meat-producing qualities of the crops grown on the various plots; but the latter experiment involves such careful investigation that it is too intricate for the average farmer to undertake. Sufficient information,

however, can be gained to show which form of fertiliser will give the best result. By this method of putting the question to the soil the answer will be given as to whether nitrogen, phosphoric acid, or potash is most required.

Then, again, the question as to which form of phosphate manure is the most suitable presents itself; some pin their faith on bonedust, others on slag, and again others on superphosphate; but the farmer should take into consideration the purpose for which the manure is required, the phosphoric contents of each, and the price. As a general rule the phosphoric acid contents of these three manures are as follows:—Bone of high standard, 23 per cent.; super, 17 per cent.; slag, 18 per cent. Bone is about twice the price of slag, and about £3 a ton more than super, so that the unit of phosphoric acid is the most expensive in bonedust. For immediate results super, of course, stands alone, slag comes next, and bone a long way after; the two latter being much more lasting in their effect than the former. As I have already stated, the climatic influences have quite as much to do with the success of the crop as the manure, so that the result of one season's trial must not be accepted as entirely conclusive; still, however, given a normal season, the experimenter has fairly good data to go on—that is, for that season's test; but that is not sufficient, for there comes the question of lasting properties, and this can only be satisfactorily proved by tests extending over a series of years.

Professor Somerville, in order to obtain perfectly accurate information as to the most profitable phosphatic manure to use, carried on his experiments for nine years before venturing to make a definite pronouncement. His experiments, however, serve to show that the more skilled a man is the less inclined he is to dogmatise or lay down rules until he is sure of his facts. The man who desires to experiment for himself must make up his mind to exercise patience and care, and carefully to note the facts for future guidance. As dairying is practically our leading farming industry, the value of the various manures as milk producers can be tested fairly easily, either the aggregate of the herd on large areas, or by fencing off four or five acre plots and testing a couple of cows in each, changing them round at intervals of, say, six weeks, the milk of each lot of cows being weighed daily. It has, I believe, never been satisfactorily proved that any particular manure has been instrumental in increasing the percentage of butter fat, but it has been definitely proved that certain manures increased the yield of milk, thus increasing the aggregate of butter fat.

Though Professor Somerville carried on his tests for the long period of nine years, there is no necessity for the ordinary farmer waiting for so long a period to get definite information with regard to milk production at any rate; It is possible to get pretty accurate results in one year, but it would be as well to make the tests extend over a period of three seasons in order to make fairly sure. So many conflicting statements are made by men, who, as a result of one season's experiments, jump to conclusions, that every man who desires to do the best for himself should exercise caution in accepting these reports, and should, in his own interests, experiment personally, for I can say of my own knowledge that a certain manure that was condemned as useless by one man gave entirely satisfactory results when tried by his neighbour on the adjoining farm, and on precisely similar land the following year.

There are so many factors operating for and against the success of the trial that great caution is necessary before condemning or unduly praising any particular fertiliser. I know of a case where a man top-dressed with slag, and at the end of the winter roundly condemned it, but before the summer was over he had completely changed his opinion; but in the meantime he told his neighbours it was quite useless. It is so easy to entertain and impart wrong opinions. In some instances bone and super have given the best results as a grass manure, in such cases the farmer is wise in using what, after careful experiment, gives him the highest return. The value, or perhaps more correctly speaking, the market price of land is steadily increasing; the man, therefore, who wants to farm profitable, will have to go in for systematic experiments. There are valuable textbooks to be obtained, any of which will give him very valuable information, and be of great assistance to him in research. From these he can learn the composition and properties of all kinds of manures, and their effects on the various crops.

I have already stated in these columns that in a new country, such as New Zealand, nitrogen is not of such paramount importance as phosphoric acid, and in some cases potash and sometimes lime. There are instances, however, where nitrogen is necessary, and in such cases care should be exercised in choosing the particular nitrogenous manure. For very quick action nitrate of soda and sulphate of ammonia come first, in the order stated, good Peruvian guano (if procurable) comes next, then the slower acting blood and bone or fish guano, both being about equal in activity. Nitrate of soda, in this country where there is a good rainfall, should not be applied until the plants are in an active state of growth, otherwise the nitrogen will be carried away in the drainage water before the plants can absorb it; sulphate of ammonia being somewhat slower in action may be sown with the seed, but even with its slower action it is sometimes advisable to use it as a top-dressing when the plants are well established. All these facts require to be taken into consideration by those who purpose making experiments as a means of increasing their practical knowledge, and, as a consequence, their profits.

It is not possible withio the limits of such an article as this to go into details; but I think sufficient has been written to convince the man who wants to extend his knowledge of farming of the necessity of going in for a system of patient and practical research. Finally, I would point out the absolute necessity of obtaining a proper quantity of humus in the soil if the best results of artificial manures are to be obtained. Many disappointments are suffered through the lack of humus, or decayed vegetable matter, in the soil, and the want of success wrongly attributed to inferior quality, or unsuitability of the fertiliser.

Pasture Cultivation.

It is one of the most satisfactory signs of progress in the right direction that farmers are devoting much more attention to the proper cultivation of their pastures and meadows. These portions of the farm, too long treated with neglect, are now being managed in such a manner as to increase their valuable productive capacity. Grass is indispensable on all well-regulated farms, and in its direct money value, and also in its collateral and indirect benefits, it is worth more to the world than all other cereal crops combined Its direct value is nothing to its indirect value in the influence it has in preserving the fertility of farms by its manurial wealth in many forms. No man can thrive on a farm, and no farm can be self-supporting where grass is wholly neglected, or advantage is not taken of stock raised on grass farms. It is supposed by many that only such soil as is not fit for cultivation of the cerals or roots should be devoted to grass. This is a mistake. Farmers can afford to take their best soils for the production of this crop, and this is the real plan for bringing them up to the highest point of fertility. In applying manure to the soil, aim to give the kind that the soil most requires. This may be known by careful observation of the kind and quality of the foods allowed the stock. The value of manure depends entirely on the materials of which it is composed. It is impossible to make rich manure from inferior feeding materials. — New Zealand Farmer

Publications Received.

We have received part six of Vol. 2 of Mr. J. H. Maiden's "Critical revision of the genus Eucalyptus."

The subjects described are E. oleosa var. Flocksoni, named by Mr. Maiden, this is a West Australia species. Another West Australian native next described is E. Le Sooefic, named by Mr. Maiden after Mr. Earnest Le Sooef, Director of the Zoological Gardens, Perth. E. Clelanda is found in the same State. E. decurna, this is a small mallee-like shrub of comparatively little importance. E. doratoxylon, Mr. Maiden mentions that this also is found in Western Australia. E. corrugata. This tree, which attains a height of about thirty feet, is so named because of the prominent ridges or corrugations of the seed cases. E. gonianatha. Mr. Maiden publishes Bentham's description of this species which he remarks is probably very rare. E. Stricklandii, named by Mr. Maiden after Sir Gerald Strickland, is worthy of cultivation for its handsome and striking flowers. E. campaspe, E. dipera, E. Griffithsii, E. grassa, E. Pimpiniana, a dwarf mallee occurring in West and South Australia E. Woodwardi completes the list of the lesser known species described.

The calf that has to be raised without milk is to be pitied. The best substitute for milk is linseed meal boiled to a jelly; mix a little portion with water and pollard, and feed three times a day.

• • • •

We realise nowadays that education is two-sided at least. As far as agriculture is concerned, there is the book side, and there is the field side. Once upon a time the man of "book learning" was despised. The book man returned the compliment by thinking little of the "practical" man. To-day a compromise is being effected: the theoretical man realises that some practice is essential, and the practical man admits that there is something in the science of the thing after all.

Economic Value of Birds.

(Chairman's Address to the Tasmanian Field Naturalists' Club).

In my address to you to-night I wish to bring before your notice the economic and useful side of our native birds, and in doing so I also wish, if possible, to bring this subject prominently before the agriculturist, the horticulturist, and the orchardist, as these are the people who are most interested in the preservation of our native birds, if they would only recognize it. At the present day, on the Continent of Europe and in America the subject of bird protection is taking hold of the community. As far back as the year 1868, at the great assembly of German agriculturists and foresters held at Vienna, they brought up the idea of international protection of birds, and from that date up to 1906 many international conventions have been held, and appropriate legislation has been passed in several of the European countries carrying on the suggestions of the international convention for the protection of birds useful to agriculture,

It may be said that there is no necessity for the protection of our native birds, but if that argument is brought forward I would only refer to one or two instances quoted by no less a person than John Gould, the well.known author of the "Birds of Australia," where he states, in 1865, "that it would require a month's search in the most remote parts of Tasmania before a living specimen of the emu could be seen, whilst in 1810, as is mentioned in "West's History of Tasmania," it is stated that flocks of emu and kangaroo were found at such short intervals that a cart might be loaded with their flesh as the result of a morning's sport. At the present time there are but two authentic skins in the British Museum; that is all that is left of them, and I ask you, "Are we to stand by and let many other birds go the same way as the emu?" We ought to remember that man must protect these birds, which are of value to his own interests, that is, he must allow useful birds every chance of subsistance—that is to say, means of living and opportunities of increase.

In 1910, Wilson, a great authority, in his "American Ornithology," states that he himself made a rough calculation of the numbers of the passenger pigeon at over 200 millions; and in 1908 it is stated in the "Auk" that there was at that time only a single pair living; and I notice in the "Ibis," issued last April, that there is now only one of these birds left, and yet about 40 years ago, when the subject came up for the preservation of this noble bird, it was stated that there was no need to protect it, as it was a migratory bird, and could not be killed out. But this was a bird that was only useful for eating purposes; and what I want to bring before you most prominently is the value of the birds to the farmer and orchardist. Since most birds eat insects, and since many eat practically nothing else, it is insect-eating habits that chiefly invite enquiry, for so active and persistent are birds in the pursuit of insects that they constitute their most important enemies.

When birds are permitted to labour undisturbed they thoroughly police earth and air. The wrens, robins, brown-tails, and yellow-tails search the surface of the earth for insects and their larvae, or hunt among the leaves and peer under logs and refuse for them.

The honey-eaters, white-eyes, thrushes, with their microscopic eyes, scan every part of the tree or shrub, branches, and leaves, and few hidden creatures escape them. The flycatchers and swallows skim over the pastures and patrol the high air above the tree-tops for such of the enemy as have escaped pursuit below. Thus each family plays its part in the never-ending warfare.

It is well that this is so, for so vast is the number of insects, and so great is the quantity of vegetation required for their subsistence, that the existence of every green thing would be threatened were it not for the birds.

One of the birds which I think is not estimated at nearly its true value is the quail, of which we have several different kinds, and unfortunately all are favourite objects of pursuit by sportsmen. These birds destroy an enormous amount of weeds by eating the seeds, and the few stomachs I have examined had only six or seven grains of wheat, whilst the amount of weed seed averaged over 283; so I would here ask the farmer to pause before he lets these useful birds be all shot out, as we well know that where 20 years ago you could find them in dozens, you are fortunate if you now see four or five at the most.

The amount of food consumed by nestling birds is not generally appreciated. The number of broods and of young vary according to the species, but it is safe to say that on the average two, and sometimes three, broods of two to four each are raised every season. The young from the time the eggs are hatched until the last offspring has left the nest demand the most constant and untiring industry on the part of the parents. The labour of feeding begins before sunrise and continues with little rest until after sunset. Meals are very frequent, often averaging one every two minutes, and it is stated that at first the nestlings consume more than their own weight of food in a day, and make a daily gain in weight of 20 to 50 per cent.

In Wallace's "The World of Life" it is stated that a blue tit brought 2,000 caterpillars to its young in 16 hours, and a pair of marsh tits made 475 journeys in 17 hours; and I myself have noted a pair of scrub tits who made 83 trips in an hour bringing grubs and small beetles. Even the common house sparrow, itself a typical seed eater, feeds its young on flies and small insects whilst they are in the nest, and I have seen them come under my verandah in the early morning and pick the flies off the roof and windows. The young at this time spend nearly all their waking moments in eating, and the total amount of material required to satisfy them is astonishingly large, as the examples I have quoted above will show.

It should be observed that whatever the character of the food of the adult small birds, the young are at first fed on an animal diet. This is probably due to the fact that animal food has a higher nutritive value, and is more easily digested than the available vegetable food. As nestlings increase from one-fifth to half daily, and at certain stages of growth require daily more than their own weight in food, it is essential that their food should be capable of the most rapid digestion; it must also be readily obtainable. Spiders, grasshoppers, caterpillars, and worms answer these requirements very well, and so they are a favourite food for nestlings of most perching birds. I have seen a wood robin carry 30 grasshoppers to her young in one hour; this would give 210 for a seven-hours day, and it is stated that a grasshopper will eat its own weight per day of grass or corn,

(To be continued).

Devon Cattle.

Though this breed of English cattle is little known in SouthAustralia it is somewhat largely bred in New South Wales, and is also we believe popular in Tasmania. The following interesting note is from Dalgety's Review :—

The origin of the breed of Devon cattle is not known with any great degree of certainty, though there is strong evidence that the "red cattle" of the south-west counties of England are descended, on one side at least, from cattle brought in from Spain by the ancient tin miners.

Be this as it may, the Devon is probably the oldest of the present British breeds, and from it have been developed the Hereford, the Sussex and the South Devon. As far as we can go through authentic agricultural records, it is found that the Devon breed has been preserved pure in the counties of Somerset and Devon. Here, through hundreds of years variations of soil, climate and management, have produced tribes or sub-divisions of the breed showing marked difference in size, the two extremes being represented by the comparatively small, though almost perfect animals from the hills of North Devon, and by the large though less handsome breed from the Somerset valleys. These latter are almost the size of the Sussex breed, to which they have a strong general resemblance. At the present time the tendency on the part of breeders is to combine the blood of these two sub-divisions and some of the most perfect specimens are being bred. The size of the smaller animals has been increased, the coarseness of the larger has been toned down, and the general milking qualities of both have been greatly improved.

In colour, the Devon is similar to the Sussex, being a rich dark red, presenting a mottled appearance with its new coat. It it smaller in size, and more compact, with good symmetrical lines and meat of high quality. It does not reach so great a weight for age as the shorthorns, the Herefords or the Aberdeens. The horn is stout in the male, fine in the female, and of medium length. A sub-variety of the Devon is known as the South Ham. This animal is chiefly bred in South Devon, and more extensively for milk than for beef production. It possesses a rich, soft, yellow skin, is a large producer of unusually rich milk, and is mainly responsible for the richly coloured butter and the famous clotted cream so largely produced in that part of England.

The Devon dairy cow is mellow fleshed, and in many instances symmetrically formed, but she is less perfect in this respect than the Devon of the showyard, which is bred for beef production, and is wanting io those finer points which characterise the perfect dairy cow. It is a fair assumption that an average herd of Devon dairy cows will produce more than four pounds of butter per hundred pounds (or ten gallons) of milk.

As milk cattle, the Devons do not compete with modern milking breeds, their yield being from three to four gallons a day. Tne milk is, however, very high in butter fat and other solids, so that 10 lb. of butter per cow per week is not unusual, and 200 lb. a year not a high average yield. Their dairy qualities are greatly appreciated in the south of England, where they are rented to dairymen at from £10 10/- to £13 per annum. The ease with which the bullocks fatten for slaughter is one of the most striking characteristics of the breed. About four months is the time allowed for finishing off from grass.

A hundred years ago, as to-day, the breed was famed for their activity and endurance, the ease and rapidity with which they were fattened, and for the production of the finest quality of beef at a low cost. The cows were esteemed as producers of a good quality milk, very rich in butter fat, from which the famous Devonshire and Dorset butters were made. It will be seen, therefore, that for more than a century the Devons have been "general purpose" animals and undoubtedly they were such long before the shorthorns, their only rival in this field, were heard of outside their counties of Durham and Yorkshire. It was the "general purpose" animal which was wanted a hundred years ago and is wanted to-day. About the middle of the last century the leading cattle-breeders of England and America were carried away by the wonderful development of the quality of beef production, and believing that this was incompatable with good milking, they neglected the dairy qualities of their cattle. The Hereford and polled Angus breeders have never since attempted to breed for milk and beef, and do not claim the dual qualities to-day. Occasionally, however, good milkers are found in each of these breeds. The shorthorn breeders, after doing great injury to their breed, realised their mistake, and many have since bred for "general qualities, though even to-day the line between beef and milk production is clearly drawn. The prize-winning shorthorns at fat stock shows are almost solely bred for beef. Very few of the Devon breeders, however, were thus misled, the great majority

f the leading breeders continu ng heir efforts to prefect a breed yielding as great a quantity of milk as compatible with the highest qualities of beef production.

In the last few years there has ome about a great and constantly rowing demand for Devon cattle, oth in England and abroad. According to a late return, that for 910, there were more than three mes as many animals of this breed hipped to various countries as in ny previous year. Among other uyers, the Japanese Government ought heavily as a result of an camination of the various breeds o' reat Britain. There was also shown arked increase in the number exorted to other markets, our own. hose of South Africa, of South merica, and of the United States. here they are in many cases being sed to convert the cattle of other odern breeds which have failed on e farm or ranch, into grade Devons. he United States Government issued cently a report on the various reeds favoured in America. In speakg of Devons it sums up as follows :—

"The 'little Devon' is a bovine xemplification of the familiar bit of omely philosophy, that articles of uch value are often found in small ackages. Mature bulls do not often eigh over 2000 lb.; but for high uality, fattening purposes, compactss of flesh and perfection of form, lendid handling and beauty when ished, the Devon is a model. With l their value for beef production, e milking qualities of the Devon ve not been allowed to deteriorate, hich gives them a special importance th the farmer in a system of versified agriculture. They are very rdy and great rustlers, and their lue in regions of scanty pasture llows as a matter of course. Devon lls are used to some extent in the nge country, specially in Texas, ving much satisfaction. Their great lue there would seem to warrant e extension of the breed on our hter pastures."

Probably the greatest ranching ate in the world is Texas, where the azing is good in summer and inrior in winter, and yet, about ten ars ago, about eight million cattle re living there under ranch condions. It is in that State that the evon as a ranching breed is best own, and pure-bred Devon bulls are ways in keen demand. In many ses cattle of other breeds have been ossed with Devons and graded into Rubies," which the Devons are affeconately called, for the reason that e other and larger breeds have led to give satisfactory results on ht pastures. This grading into vons has been done to a large ex t in South America and the United ates, and is not uncommon in parts this country. This is mentioned in idence of that fact that where graz is light it is a great mistake to empt to utilise any of the heavy eds which are, in size beyond the acity of the soil, and food supply. It is a mistake which has been made by thousands of breeders all over the world.

The following is from an address by Dr. French, who has in the River Plate — probably the greatest ranching country in the world—a herd of over 3000 pure-bred Devons. After stating the conditions of grazing in that country, he says :—

"We have now to consider what breed or breeds of cattle are best suited for these conditions. May I call to your memory some of the older breeders' maxims, which may make my argument clearer and are of great assistance in selecting a breed for a particular locality. Every pound of weight represents so much food, or its equivalent. It is in vain to try and increase weight beyond the capabilities of the food supply. Another important system often neglected in the Plate is to proportion the size of the beast to the quality of the pasture, and it is better to have cattle rather undersized than too large. Now, of the British breeds of cattle, the Shorthorn, Polled Angus, Sussex, and Hereford may be classed as the larger breeds; the Devon, the Galloway and Red Polled are representatives of the middle breeds; while the Jersey, Dexter, and Kerry are the small breeds. It must follow that the larger breeds require most food, and the middle breeds require more food than the smaller ones, for their proper growth and development. The larger breeds can only be reared where there is a plentiful and constant food-supply all the year This condition rarely exists under the present system of cattle raising in the River Plate. The middle breeds can be reared on much less food, and the food-supply is sufficient, or nearly so, to develop them; therefore, the middle breeds are better adapted to the existing condition of stock-raising in the Plate."

The above quotation is given as there are no doubt large areas in Australia which are not dissimilar to the ranching countries of Texas, and the River Plate.

Care of Brood Sow and Pigs.

An American pig breeder writes :— Within a week or two of the time the sow is to farrow, put her in a separate pen with a small yard attached. Give her some clean straw for bedding, not too much. After she has farrowed let her alone for twelve hours. Then give her some water in a trough. Water will be all she will require the first twenty-four hours. After twenty-four hours give her some oats, with plenty of water to drink. Do not feed her too much the first week, or you may cause her to become feverish, the milk may cake in her udder, and there may be a consequent loss of the pigs. After the first week, increase the ration. Give her corn, oats and skimmed milk. When the pigs are about four weeks old a part of the pen should be partitioned off, with the partition raised so the pigs can go under. In this part place a trough with skimmed milk. And give them oats and corn to eat. When the pigs are eight weeks old wean them. Give them all the skimmed milk they will drink, with all the corn they will eat up clean, and relish the next meal. At eight months of age they should weight 250 to 300 pounds.

Notes in Passing.

— 1912. —

The year which is now closing has been one of the most prosperous on record for poultry keepers. It would probably be incorrect to congratulate ourselves on any extension of the poultry industry as a whole, in fact any movement there has been, has perhaps been in the opposite direction. Prices for eggs and poultry, however, have been high, and sellers have been on velvet. What has really happened during the last two or three years, more particularly during the latter portion of the period, has been a re-arrangement of the sources of supply; that is to say, the Farmer has supplied less while the Poultry Farmer and the small holder generally, has supplied more—the decrease has, however, been greater than the increase. Some years ago, in the bad times when a man went on the land, his first thought was to b— a cow and a few fowls. Times have changed and in these more fortunate days his first purchase is often a motor car. Brer Fox has also taken a hand in the game and, according to many reports, has been so small factor in bringing about the present high prices. How long will they last? This is a question of vital importance to those who are looking to poultry for their living, especially is it so to those who are putting money into up-to-date plants. At present prices poultry farming is a soft thing. Long may it continue so! We see no reason why this pious wish should not be fulfilled, as long as the farmer with his almost costless production does not take a bigger hand than he is doing at present.

THE FANCIER.

Another pleasing feature has been the greater interest which has been taken in standard bred birds. Judges at country shows have been unanimous in their reports of better quality, better numbers and a better standard in general as regards the purebred bird in the districts they have visited. Naturally, therefore, breeders of purebred stock have enjoyed a period of success, to equal which they have to go back eight or ten years, before the Government butted into the business, and naturally and inevitably knocked the private breeder out of time. Fortunately apparently the Government pens have either died out, been sold out, or kicked out. At least we do not notice any reference to them in official publications. Of course we do not forget the Leghorn pens which appear to be going strong and selling by the thousand. It would perhaps be cruel to speculate as to what part, if any, these thousands have had in bringing about the present prices in eggs. If people will buy poultry with nothing but the Government brand as a guarantee they need not be surprised at anything which may happen, even the 365 egg hen is a possibility.

THE COMPETITIONS.

There does not seem to be any likelihood of anything of particular interest happening in connection with the current competitions. They continue to confirm the finding of the Maine Experiment which, extending over ten years, has established the fact that selection as ordinarily understood is not of the slightest value in building up a flock of heavy laying birds. The competitions have exposed the fallacy more openly, that is all. How much, or rather, how little a practical and experienced poultryman may know of the probable results of any given mating, is well shown at the Hawkesbury College, where breeders in response to invitation sent two pens—one, in their estimation, good; the other, bad. The results to date appear to psove that Biddy is a gay deceiver ever—for their owners' expressed opinion as to their probable performances seems to bear very little relation to their actual accomplishments. At Roseworthy the only item of interest is the C section, and the official report as to what it was intended to show, and how it was intended to show it, and whether it did show it, whatever it was, will be awaited with interest. At present it seems to be one of those inscrutable mysteries to which followers of official poultry work are so well accustomed. Quite apart from this and other mysteries it is a matter of regret that Mr. Hart unexpectedly severed his connection with our poultry department. Mr. Hart, in his quiet unobtrusive way, had done much good work, and his willingness to help and the interest he invariably took in his work, made for him many friends throughout the State. This being so his resignation came as a surprise to many; not perhaps to his friends or more intimate associates, but certainly to many breeders who appreciated the qualities which made him so good a friend and helper to those interested in poultry breeding. We heard the situation summed up somewhat as follows by one rather given to speaking in parables: "There was once a King who had

big crown, and not much else. ıis King had a minister, who had › crown, merely the goodwill ol ie crowds who came to the ılace for advice and assistance. ıe advice he gave was so good ıd the assistance so prompt that adually people forgot about the ing and ceased to bow down to m and the Minister, being a odest man arose and fled to a r country and the reason—well, was not an unscrutably mystery except to a fool.

Chickens in Summer.

\n America poultry breeder writes ıollowed of the summer care of icks.

All birds crave animal food, and ıen given free range will partially wholly supply this want by gather- ; insects, worms, etc., but the range ver supplies the amount necessary r the most rapid growth during the te spring and early summer, and rely does it at any time. Meat ıal is the most available animal od we have to mix with the ams to balance the ration; it is gh in protein. A larger per cent chicks will pass the brooder age and ach the two pound weight fully two eks earlier, if half the protein fur- shed is animal food than if all the otein is contained in the vegetables. rom the fact that much less food is cessary, on account of animal otein being more digestible, and owth so much more rapid by its ldition, the cost of production per ound will be from one to two cents ss.

Feeding too little food, feeding ir- gularly and spasmodically, and feed- g food deficient in some nutriments too strong in others, has practical- the same effect, causing imperfect rm, irregular markings in parti- ılored fowls, and retarding the athering out process. Carbonaceous fat-forming foods, if fed too heavily young animals, retard development bone and muscle, producing a dwarf- l animal and materially impairing ıe breeding qualities.

It has been found by tests that the rength of the fibre of wool can be eakened and even broken by alter- ate starving and overfeeding of highly rbonaceous food.

— The Barring of Plymouth Rocks Can be Influe by Food. —

Symmetry of barring can in like ıanner be largely controlled by feed- ıg foods containing all the elements cessary for feather development, and eding regularly and in quantities ıfficient for natural, steady growth; r, barring can be made irregular by pasmodic feeding or by increasing ıd decreasing alternately the food ements.

Note how quickly a well fed May atched chick will feather out on free range, and how perfect the form and how even and distinct will be the barring. The food elements necessary for constant growth are available at this season of the year, and most of the best prize winners are hatched in May.

Corn is a carbonaceous or fat and heat forming food and should not be used too largely in the ration. While it is claimed that a corn-fed range chick will find much to balance the ratio, for my youngsters I prefer to balance as nearly as possible the food given, because experience teaches that a half grown chick will fill its crop with the first food available without regard to food properties.

Grit of the best quality should be given in liberal amounts. On a small place where poultry has been running for years most of the natural grit has been used. Unless other grit is furnished, the grinding machinery be- comes deranged and poor health and disastrous results follow.

Milk is the most valuable food for chicks. It is the ideal animal food, perfectly balanced and containing protein and other elements necessary for rapid growth. In very warm weather it is impossible to keep it from souring, but for chicks over six or sour and the chicks will thrive wonderfully.

—What Constitutes the Ideal Range.—

An ideal free range is a plot of grass with good natural drainage and shade, surrounded by general field to select the foods most suitable to the chicks with a variety from which weeks old, it can be fed either sweet crops, grains, grasses, etc., providing their wants. Of all field crops, clover and alfalfa are the most valuable, be- ing natural harbors for insects and furnishing the most nitrogenous green food to be had.

This plot or portion set apart for the brooders and colony houses should be closely clipped, or if the trees are large, it can be pastured at night and kept short. This prevents the chicks from getting wet from dew, and facilitates driving them to shelter dur- ing rains. It is doubtful if any one cause kills more chicks and makes more trouble than wet grass and weeds.

Charcoal is well worth the cost and trouble to provide. It absorbs the gases and other impurities in the system and it is surprising the quan- tity the chicks will eat.

— Two Feeds Daily Preferable to Hoppers. —

Keeping food continually before the chicks and feeding twice a day are the two methods usually followed in feeding dry food. The first is the least trouble, but I rather prefer the latter, as chicks fed twice a day will range farther, not depending so much on the feed box; they will gather more of the waste, also insects, etc., found on the farm thereby reducing the cost of food and develop bone, muscle and a perfect digestion.

A poultryman should keep in close touch with his flock. Feeding twice a day furnishes the opportunity to study the chicks, the effect of the matings, of noting the first approach of disease or vermin, and seeing and attending to many minor details of successful poultry culture.

Elaborate and costly houses are not essential for best results. In growing chicks to maturity and during the season of spring and summer, all that is necessary to produce the hardiest and most perfect birds are brooders, colony houses and out door roosts. When a brooder is found that most closely imitates the old hen and suits your requirements, install it, regardless of cost. Colony houses need not be expensive; they should be dry and comfortable, with plenty of doors to let in the sunlight and air.

— How to Construct Inexpensive Colony Houses. —

The proverbial piano box can be mane into an excellent small colony house by cutting a door in one end, and a large opening 2 feet from the bottom in the straight or high side (full width of side), with door so formed hinged at the top. This open- ing can be covered with wire netting and the door propped up to admit sunlight in the daytime and pure air during the hot summer nights. Runners of 2 by 4 inch stuff facilitate moving, and a covering of tar-paper completes the house.

Out door brooders are placed on the range and when the chicks are from six to eight weeks old the brooder is moved and a colony house sub- stituted.

Chicks are next moved to a large colony or general purpose house. This house is built of weather board, is 5 feet wide by 8 feet long, 6 feet high in front and 4 feet high at the back. There is a door at one end to enter the house, and two openings 2 feet deep by 5 feet long in the front and back. The bottom of these openings is 1 foot above the ground. The open- ings are covered inside with wire net- ting, and on the outside there are two doors (hinged at the top) that can be lowered in stormy weather. The roosts are placed on a level with the bottom of the openings, making practically a covered out of door roost.

When the colony houses are crowded they are moved, and out-door roosts are erected in their places. Here the now well grown birds take the weather as it comes till late io the fall.

These large colony houses are placed on runners and moved at will, and are used the year around. In them, ten to fifteen head of breeding stock can be wintered.

When mating time comes, one is placed in each yard, enabling me to have new fresh yards each year, and afterwards they are used for young stock.

The Dangers of Breeding from Diseased Fowls.

The best thing that can possibly happen to a really seriously diseased fowl is a prompt extension of the neck. It may require a little courage at the moment, but in the end it will save much trouble and worry, and prove a decidedly remunerative proceeding; and if this course is promptly followed with the first case that appears in a poultry-breeder's yard an epidemic will probably be prevented, and the great danger of breeding diseased offspring will be thus averted. With a sick mongrel, it is quite likely prompt execution may be practised without much hesitation; but what happens in the case of the highly-bred exhibition or pure-bred specimen, or in the case of a pedigree layer, with a champion trap-nest record, plus possibly a prominent position in one of the laying competitions? Such a bird is, in its owner's opinion, far too valuable to be thus peremptorily disposed of just because it happens to have contracted roup, or developed symptoms of liver disease or tuberculosis, or any of the many other hereditary diseases to which poultry flesh is heir. So he coddles it up, doctors it with various nostrums, sometimes suitable, oftentimes quite the reverse, until in the end, after a vast amount of trouble, he is perhaps successful in so far patching up the patient that the outward and visible signs of the inward disease are dispelled, and the bird once again presents the appearance of a healthy specimen; but such appearances are in the majority of cases delusive. A fowl that has once been seriously affected is rarely, if ever, thoroughly and safely cured, and at any time it is liable under encouraging conditions such as unfavourable weather to break down again. But all this is not considered; the patient is "cured" (?), and if an exhibition specimen it is again allowed to follow its show career, which further strains and weakens its already delicate constitution, and, finally, whether a show bird or a utility laying sprinter, it goes into the breeding pen, where it will possibly, more or less, according to the disease, contaminate all the rest of the inmates, and almost certainly reproduce in its offspring the same undesirable troubles from which it has itself been a sufferer.

Against thus doctoring up of a show specimen in order to again fit it for exhibition there is not much to be said. The trouble may be worth the results to the owner, but under no circumstances should such a bird be bred from. The disease is not only liable to again crop up at all times and seasons when least expected, and thus upset breeding arrangements, but will also most surely bring trouble a hundredfold in the succeeding generations, whilst if eggs for hatching are sold from such specimens they may prove the means of spreading the disease all over the country. Ask a farmer if he would knowingly breed from a glandered horse or a tubercular cow, and yet such a proceeding would only be on a par with breeding from a fowl of either sex that has been affected with any of the numerous contagious and hereditary diseases to which poultry are liable, and, possibly more than any other animals, inclined to transmit to their young and which, when they do not appear in the next, frequently crop out in succeeding generations years afterwards. Cures like that above referred to are usually superficial; the taint of the disease in the majority of cases remains in the blood—lurking within, ready to break out again on slight provocation, or to be transmitted to the offspring. The breeder of fowls who desires to produce strong, healthy, vigorous stock should exercise the greatest possible care in excluding from his breeding pen every bird that has at any time shown the slightest sign of disease. It may seem hard at the time to kill or ostracise otherwise valuable specimens, but it will pay many times over in the end, and if greater care in this respect were generally practised, we should hear much less of poultry epidemics and failures in poultry keeping, the length of the post-mortem columns of the various poultry organs would be considerably reduced, and poultry-keeping of all phases would be much more remunerative. It is the delicate, unhealthy specimen that causes so much care and trouble, and in the end picks the pocket of its breeder.—"Mark Lane Express."

A Study in Poultry Feeding

I have no pet theory to offer and do not claim to have discovered or invented a system of feeding that is the best or applicable to all cases; in fact, by reading a half-dozen poultry papers the greatest satisfaction I got was the conclusion that it made but little difference what the system or the food is if proper care is exercised. Many people claim their method is the best, and some succeed with exactly opposite methods. I could come to no other conclusion than that it is often the smaller items of care not considered worth counting that ensure success rather than any fixed rule as to feed or method.

Some of my own conclusions briefly stated, are:—That if

could not have both I would leave out the meat and bone and give a good supply of green food the year round — grass cut fine in summer for young chicks, and the same dried and cut, or vegetables run through a bone-cutter in winter. That if hens are fed on proper material for the production of eggs there is little danger of their getting too fat to lay.

The claim that farm-raised birds are better than those grown in small quarters does not agree with my experience. Mine are Partridge Wyandottes, and for four years I have had some grown on a farm, as I had limited quarters in the city; but I have always gotten the best birds from my city pens. Three years ago a neighbour in the city bought eggs from me and raised 13 chicks in a yard about 5ft. by 12ft., including coop, and they were kept there in freezing weather. One of the pullets at eight months weighed $8\frac{1}{2}$ lb., 3 lb. over standard weight, and there were none in the flock below the standard weight for birds a year older. He fed them as I did mine, by using a machine to cut the grass.

I have the same regard for a man who will keep his fowls in open houses here at the north that I have for one who wraps himself in fur coats and mufflers and drives a horse with hair clipped to the skin. Between extremes suits me best.

I have lately gotten an idea, but have not tested it enough to reduce it to a theory, that in feeding for eggs it might be better to use the same ration continually; have as much of a mixture as I please, but let the hens have the same every day rather than call on the system to adapt itself to something new often. For growth a different plan might be better, but perhaps not even then. I have not followed very closely the rules given for a fixed number of square feet for a hen. I once wintered 28 pullets in a house 8 x 12 feet, and a scratching shed 6 feet square, and got 25 eggs two days in succession, and more than 20 a day for a long time. The idea of free range might be applied to pigs or ducks as well as hens, and both of these are grown successfully and for many generations in small quarters.

In regard to following nature in feeding fowls, I find it would be rather a crooked path.

The success or failure of the poultry business, probably to a larger extent than most other lines of work, depends on the close attention to the small details connected therewith. To the beginner, especially, does this appeal, as he realizes after the first wave of enthusiasm begins to subside that the poultry business is not the avenue that leads to the palace of indolence, neither is it the "Aladdin's Lamp" which brings to the fortunate possessor every heart's desire, with no expenditure of labour in its attainment. Each success must come as the reward of earnest effort intelligently directed. However, in no direction is diligent and painstaking attention to the work in hand more sure of reward than in poultry-culture. The haphazard method of rearing poultry which was in vogue in the days of the scythe and cradle will not do as a companion of the improved machinery and intensive farming of to-day; nor can the owner of the mongrel hen, which must steal her living from the feed-boxes of the horse and cow, or snatch a stray kernel of grain from the pigs' portion, while her shelter is left to her own choosing, expect to become the successful competitor of him who studies and supplies the varied needs of his feathered charges. Science and balanced rations seem to many a "goblin" that frightens farmers and debars closer study, instead of the beacon light that shall guide them into the harbour of success. Science, as applied to poultry culture, should be but another term for common sense, and balanced rations should have no more terrors for the poultryman than when called other names by the pig-raiser when he uses one feed for his growing young stock in order to lay the foundation in health and frame that he may later change his feeds and build up with fat on the foundation which largely by his intelligence in breeding he has previously laid; or the dairyman when he lays the foundation of one system of feeding for his future milk-producers, or by another combination of feeds he is able to produce prime beef.—American Poultry Journal.

If a bird is attacked with chicken pox, isolate it at once, as the disease is highly contagious.

Breeding Top-Notchers in Laced Wyandottes.

An American correspondent has been breeding Wyandottes (Golden and Silver) for eighteen years. He writes:—"During that time there have been several changes in their make-up in order to satisfy Standard requirements, and advice in regard to mating to produce "top-notchers" may not be out of place. Experienced breeders will bear me out in the statement that great care must be exercised, in the mating of breeding pens, as there are many difficulties to contend with. In the Goldens we must have that rich, deep bay color, clean open centres, free from frosting, with correct size, shape, etc. In the Silvers we have the extremes in color (black and white) to contend with, and unless your breeding pen is made up of choice specimens with whose breeding you are familiar, the chances are that you will be sadly disappointed when you see the results.

All things being equal in the breeding pens, I find that the Goldens produce a larger per cent. of high-class birds than do the Silvers. Black and white are two colours hard to control, and if you have a well-bred specimen with a weak section, do not expect to breed it out in one season.

— Buy Mated Fowls from an Established Breeder. —

If I were to begin again, I should buy a trio or breeding pen from some well established breeder, one who has been in the business for years. Do not expect to obtain a fifty dollar trio for ten dollars. You will find that the best you can afford to buy will be the cheapest in the end. Ask the breeder to mate them for best results, and if he understands his business and you are successful in raising the chicks you will have made a proper start. In buying a trio, I should prefer a yearling cock, one hen and one pullet, or an early hatched cockerel and two yearling hens. Hatch all the eggs laid the first season and if the male molts out well and you are satisfied with the chicks he produced, breed him back to eight or ten of the best pullets. The following year buy another male from the same breeder, and you will soon build up a flock of high-class stock.

Line-breeding, carefully and systematically carried out, is the only way to get to the top. When I first began breeding, each year I would purchase a first prize cock or cockeral at a show, irrespective of his breeding or strain. I have paid high prices for some of them, but never obtained more than a small per cent. of fair chicks. It is necessary to line breed to get the desired results. Your first prize exhibition bird will not always prove your best sire. By making a study of your matings you will soon learn the proper birds from which to breed.

— Standard weight Wyandottes are Preferable. —

I prefer a cock or cockerel of standard weight rather than one a couple of pounds over weight. I have a very fine Silver cock that weighs 10½ pounds, and is not fat, but this is two pounds heavier than a breeder should be. I mated him to two extra large hens and three pullets. The pullets were beautifully laced in every section, and I was anxious to get eggs from them, but they were late hatched, and a little small. I set 50 eggs from that pen, 30 from the pullets and 20 from the hens. Fifteen of the hens' eggs were fertile, but only five of the pullets' eggs proved to be fertile. I then placed those three pullets with a yearling cock that is just standard weight, and the first test of eggs showed 95 per cent. fertile. I mention this merely to prove that males over standard weight do not make as good all 'round sires as those of standard weight.

— The Correct Lacing and Type of the Breeders. —

In mating up your pen choose a male of good shape, see that he is not tightly laced on saddle, but has good, big, open, diamond-shaped centers, with a well-laced wing-bar. The breast lacing should not show too open centers, but the color must be good in that section; hackle, and saddle well striped, and of good color, with rich, yellow legs and bay eye. A bird of this description mated to standard-coloured even-laced, deep-bodied females will produce a large per cent of high-class fowls, especially in pullets. Females that molt out good and clear in cushion should be treasured. It is hard to get them, but by using care and culling closely when making up your breeding pens you will be successful. Breed only from the very choicest of your pullets, and if they do not molt out well the first year, keep them another year, and the chances are that some of them will molt out as clear in cushion as when they were pullets. I have a Silver hen seven years old, and every second year she molts out as clean in every section as any pullet I ever saw. Of course she doesn't lay as many eggs as she did when a pullet, but they are priceless.

I have kept a great many of the different breeds, but have never found one to equal well-bred Silver Laced Wyandottes.

Present Position of the Feeding Problem.

Nothing better illustrates the rapid changes that are made in poultry keeping than the changes in methods of feeding. Probably more is now being written on the feeding problem than all other matters "touchin' on and appertainin' to" poultry. As most know, twenty-five years ago there was little method in feeding, and mostly madness in that. Chicks when hatched were thought to be hungry, and were gorged with sloppy food. Now they are not fed, or should not be, under forty-eight hours; some say seventy-two—another extreme. Whole grain, generally maize, was about all old fowls received, never any kind of green food, and seldom ground feed. The day of dry feed, skim milk, cut green bone, and meat meal had not yet dawned. Ten years ago a system had evolved, and there was one fact above all others impressed upon us by the poultry press, and that was the importance — the paramount importance—of exercise, the prime necessity of keeping the hen busy, "everlastingly at it." Make her scratch for every kernel—scratch, scratch, scratch! that

was the slogan. The litter must be deep, and clockwork devices were made for throwing out a few kernels at intervals throughout the day, keeping the hen busy the livelong day. This was one extreme.

But, lo! what hear we now? Nothing but dry feeding, hopper feeding; that is the battle cry. Before it was work; now it is meals at all hours—one grand, continual feast for fowl. The pendulum has swung to the other extreme again. Between the two lies the truth, as usual. There is some wisdom in this system of dry hopper feeding, we agree. But it isn't the whole thing. Other systems are as good or better. It may be a good way for some, but not the only way.

That hopper feeding is a wasteful method goes without saying, but the economy in labour, especially on plants, is some compensation. In the first place, it is difficult to construct a hopper by which the feed will not be wasted; in the next place, fowls will gorge themselves on whole grain and then loaf around, and become fat, and broody; especially is this true of the heavier breeds. Egg production will be increased for a time because of the greater consumption of food, but there is a reaction, and the early good effects are more than offset by the ultimate bad effects. We tried whole grain in hoppers writes an American breeder—until threatened with bankruptcy by the feed bill. The wisdom of hopper feeding is at best an open question, and is so acknowledged by high authorities, as we have found by correspondence with some of them during the past season. We confidently believe that the hopper system exclusively would eventually turn the sprightly, active Leghorn into a sluggish, idling fowl: and why not? Can we not by constant breeding with certain environment change the habits, and nature of any breed? Could we not cause the broody Rock or Wyandotte to become practically as non-sitting as the Leghorn by line-breeding, and never allowing them to sit? That this could be done few will question. If so, why cannot the nature of the Leghorn be changed by the hopper system? We firmly believe they would become a class of idlers and drones, losing the foraging instinct, one of its best traits, that they would toil not, and that neither would they spin. And if this would occur with the Leghorn or Minorca, which are now willing to work for a living, what would happen to the heavier breeds?

We have it on good authority that the world was made in six days, and there was evidently no time left in which to construct hoppers. The Jungle-fowl had none, and this was the natural condition. We believe it best for fowls as well as man to work a reasonable amount for a living. A child born in ease and affluence will generally amount to but little. A chick born in affluence, with corn, wheat, and animal food before it in abundance, is supposed by the hopper system to balance its ration better than man can do for it. Under natural conditions there was little danger of a fowl eating too much of one kind of food, but if there is no limit to corn, and highly concentrated animal foods we think they will eat altogether too much of these for their own good. At least, we have found it so.

But in all this bushel of chaff relative to hopper feeding we have found a kernel of truth. It is this: Ground feed in hoppers, we have found a good thing. Fowls do not like dry ground feed well enough to gorge themselves as on whole grain, and as a reserve store it has its uses in hoppers. If a fowl does not get enough by scratching, or if kept away from the feed-trough by domineering hens, she can fill up at the hopper, and go to roost with a full crop, contented. It also saves some labour, and the busy man is not so closely tied to his fowls. And in this connection we will state that we employ the moistened mash, properly seasoned, just the same, two or three times a week at least, and in this mash we place the animal food; but this, of course, could be put in the ground feed in the hoppers if desired. We find the hens eager for the wet mash, no matter how much or what kinds of other food they have; and anything they are so eager for we believe, to a reasonable extent, good for them. It is a change, and they like it. We feed the greatest variety of whole grain to be had in litter—corn (little in summer), wheat, oats, barley, and buckwheat. Fowls, old and young, have free range most of the time, and we can say that we have had more eggs, and better health under this system than ever before.

Feeding whole grain, and no mash, wet or dry, will not produce the best results in laying, as the Maryland Station has conclusively proven. Three pens were tried, one whole grain exclusively, one whole grain, and ground feed, and one entirely fed on ground feed. The whole-grain pen fell far below the others, and the ground-feed pen led, although, but little ahead of the pen fed half and half. Hatchability of eggs was equally as good with ground feed. Fowls cannot grind, and assimilate enough whole grain to produce the best results. We feed wet mash at night, believing it best for fowls to go to roost with their crops full of food easily digested; whole grain in litter in morning, keeping them moderately busy throughout the day, and always one or more kinds of succulent green food.

Do not over-stock small yards. If you do, the ground will get charged with ammonia, and the birds will sicken.

A wry-tail in poultry is a sign of in-breeding.

Preserving Eggs.

The three best methods of preserving eggs are coating them with vaseline, preserving them in lime water, and preserving them in water glass.

Coating the eggs with vaseline is one method. As the entire process of preservation is an effort to fence out germs, vaseline, or some equally tasteless grease, such as fresh butter, can be used. The process consists of greasing the eggs all over as soon as they are laid, then setting on end in a clean jar until wanted for use. They keep perfectly for three or four months in this way.

The process of keeping them in lime water is:—Slack four pounds of lime then add four pounds of salt, add eight gallons of water, stir, and leave to settle. The next day stir again. After the mixture has settled the second time draw off the clear liquid. Take two ounces each of baking soda, cream of tartar, saltpeter, and a little alum. Pulverise and mix; dissolve in two quarts of boiling water. Add to this the lime water. Put the eggs in a stone jar, small end down, one layer on top of another, and pour on the solution. Set the jar away in a cool place. This method is quite satisfactory, but not so good as the water glass as the eggs are liable to taste of the lime.

The water glass method such as Burford's Magic Egg Preserver is undoubtedly the best preserver yet discovered. The most difficult point, probably in using the water glass for preserving eggs is in its tendency to vary in quality. Water glass is also called soluble glass, or dissolved glass, liquid glass, and silicate of soda. Water glass is made by melting together pure quartz, and a caustic alkali, soda or potash.

The directions for use: Use pure water which has been thoroughly boiled and cooled. To each nine quarts of this water add one quart of water glass. Pack the eggs in the jar and pour the solution over the eggs. The solution may be prepared, placed, in the jar and fresh eggs added from time to time, until the jar is filled, but care must be used to keep fully two inches of the water glass solution over the eggs. Keep the eggs in a cool place, and the jar covered to prevent evaporation. A cool celler is a good place in which to keep the eggs.

If the eggs be kept in a too warm place, the silicate will be deposited, and the eggs will not be properly protected. Do not wash the eggs before packing, for by so doing you will injure their keeping qualities, probably by dissolving the mucilaginous coating on the outside of the shell. For packing, use only perfectly fresh eggs, for eggs that have already become stale cannot be preserved by this or any other method, and one stale egg may spoil the whole batch. Use only glass or earthenware jars.

Cramming for Market.

— Cramming by Hand. —

This is a very old system, and from tablets in one of the Egyptain pyramids it would appear that people so crammed their geese four thousand years ago. In this country many geese feeders always during the time of feeding off force one or two balls of food into the birds' crops, if they think that enough has not been eaten. So far as fowls are concerned this method of fattening is much more common on the Continent of Europe than in Britain. In the south-east of England probably 95 per cent. of the chickens are crammed by machine, perhaps even more, but some of the finest specimens produced are hand-fed, usually by those who do not turn out more that 200 to 300 per annum. But in France it is not so. It may, however, be explained that in that country we do not find separate establishments prevailing to the same extent. Many of the best fatters hatch and rear the birds, though there are exceptions to this rule, but rule it undoubtedly is. As a consequence operations are on a smaller scale than in Sussex. With these people time is not of the same object. They do the work themselves, and hence the question of labor does not assume the same importance. In the larger fattening establishment funnel or machine cramming must necessarily be adopted, for it would need a small regiment of men to hand-cram four thousand birds. There are two ways in which this system is carried out, but perhaps, it is incorrect to term the first cramming at all. In this case, and it is largely met with in the La Bresse country, the bird is placed upon the knees of the operator, its feet being held firmly between them, and he places a small piece of prepared paste into its mouth, continuing until it is satisfied. Sometimes, however, he concludes by forcing one or two pellets into the crop should he not think enough has been taken. In the second way, the food is formed into pellets, about an inch long and half an inch thick, these being prepared beforehand. He has a bowl of milk. Sitting upon a low stool he holds the wings and body of the bird between his knees so that it cannot struggle, opens the mouth with one finger and thumb of his left hand, then dips one of the pellets into milk, inserts it into the bird's mouth, forces it down with his finger, when it can be felt just below the wattles. He now elongates the neck, and running the finger and thumb of his right hand down the outside of the throat, but above the pellet, he carries it into the crop. The process is by no means difficult, but necessarily slow, as ten or a dozen of these pellets may have to be given ere the crop is full. There can be no doubt, however, that splendid specimens of table poultry can be produced in this way, and each bird can be dealt with individually in a way scarcely possible when more rapid systems are adopted.

— Cramming by use of Funnel. —

Another method is by funnel, which is chiefly followed in some parts of Normandy, but very good birds have been produced in this way in England and Ireland. For the work a specially made funnel is used, with a narrow and rather long spout. This must be well finished, without any roughness or sharp edges, otherwise the throat wouln be grazed and inflammatory action set up. The mouth of the spout is generally cut angular, so as to pass down the throat easily, is turned and soldered. When a funnel is used the food must be prepared rather thin, for if thicker it would not flow easily, generally about the consistency of ordinary cream. The oueratot sits down, holds the bird as described before, elongates the neck and opens the mouth with his left hand, then inserts the funnel until the spout mouth is felt in the crop. Then a ladleful of food is poured into the funnel, and it is at once withdrawn. This system can be more quickly practised than described, but requires great care, otherwise the bird may be choked. Unless the neck is quick straight it may be broken when passing the spout down, and if too much food is poured this will rise in the throat and suffocation result. When learnt it takes but a few seconds, and is a very effective way of fattening, the large quantity of milk in the food giving excellent color of flesh.

— By use of Cramming Machine —

Fattening by machine, is the quickest of all. This great speed, however, does not conduce to highest quality, and it is better to do the work more carefully. We must not measure every one by the exceptional expert. A hundred to a hundred and fifty in an hour is not only possible, but can be done and ensure care with each bird.

In France there is a combination of the funnel and machine systems. A machine is employed, with liquid food The tubing is five or six feet long, so that birds can be reached in the pens without removal, and a spring tap is fitted to the nozzle, which when the latter is inserted into the throat if pressed, allows the food to flow. In this case the reservoir hold-the food must be placed above the cages so that the contents will run down the tubing.

The point is how much will this system cost. Our experience has been that for food alone birds can be fattened for a period of three weeks for five pence, and whilst all will not attain the same measure of perfection, we find that birds will increase from 1½ to 3lb. It must not be expected, however, that anyone can simply take up this work and that they will attain these results. Fattening is one of the most skilful parts of pountry production, and the best results are often obtained by people who have been bred to the work, and whose forefathers were engaged in it. It can be learnt, however, but the beginner must not expect to secure as much as we have stated at the outset. Many make a mistake in not killing the birds soon enough ; as soon as they begin to look pale in the face, then they should be starved and killed at once, even if the full three weeks has not passed since they were placed in the cages. Sometimes during the process it is found that birds go sick, generally those that have not been in first-class condition when put up, and in this case they should be removed to an open run where there is plenty of grass, leaving them there for a few days.

If your chickens are kept in small runs they will not thrive unless they occasionally get a change to fresh soil.

Fowls which are overfed in the morning are sluggish all day and become lazy and go out of condition. It is exercise of muscle that creates proper functional tone. All birds are active by nature. If productiveness is expected, natural laws must be observed. Feed moderately in the morning, especially when the flock is small and kept in limited range.

Pigeon Notes.

Tumblers.

FOREIGN VARIETIES.

(Continued from last issue).

Among show Tumblers of foreign origin the German Beard in one of the prettiest varieties. In Germany it is known as the Brunswick Beard. It is somewhat longer in face than the pure English flying Beard, which I believe is bred in Germany as well as here, and which probably reached us with the Baldhead during the early part of last century from the Continent. The German Beard is also peculiarly marked, the beard being in the form of a round spot below the lower mandible, and not reaching to the eyes. The primary flights should be white, and the rest of the plumage coloured; but they have generally some white about the lower part of the thighs, near the hocks. The colour of these birds is generally very good and full of lustre, and they are found in black, red, and yellow, always with a white beak and pearl eyes. Some have feathered legs, in which case the feathers on legs and feet ought to be white. They are entirely distinct from our native breed, and ought never to be classed with them at shows. I believe they have entirely lost the tumbling propensity, and are merely toy pigeons.

The Double-creasted Almond Tumbler is similar in size and shape to our common flying Almond, and first reached us from Turkey or Asia Minor. It has a shell crest behind the head, and a rose on the forehead resembling that of the Trumpeter, but smaller. I had a number of these birds, and some of them could tumble very well. There are other colours in the breed, such as blacks, reds, and kites. I bred some nearly white, which was probably on account of breeding Almonds together.

The Brander is a Danish Tumbler of very distinct race. The under-fluff of its feathers is black, but each feather is tipped with lustrous bronze, so that the bird appears all over of a copper colour, excepting the flights, which remain black at the tips, and the tail, which has a band of black near the end. This gives it the appearance, when not flying, of a lustrous copper-coloured bird with black tail and flights. It was formerly known as the Fire Pigeon, and is similar in size and shape to our common Tumblers. It has pearl eyes. A peculiarity about these birds is that every one of them has at least one white feather on it somewhere. It may be in the hackle, on the back, under the wing, or on the belly. In breeding the Brander it may vary in two directions: dark young ones are accasionally produced, showing too much black through the bronze; and also light-coloured birds, red in colour, with whitish tail feathers on which there is a bar of red instead of black. These have the under-fluff of their feathers white. I have a number of Branders, which I find good feeders for other varieties. They look beautiful in the sunlight.

The Veiled Tumbler also comes from Denmark, and is, like the Brander, a smoth-headed and clean-legged breed. It is marked like the Nun, but mottled on the breast and body as well. I have a number of these Tumblers, both reds and yellows, of beautiful, deep, rich, lustrous colour. They have pure white eyes and red eye-ceres, are somewhat longer in beak than our common Tumbler, and in size and shape resemble the larger specimens of Magpies.

The Magpie Pigeon, now so common, originally came from Denmark. It is known on the Continent as the Danish Elster Tumbler. Formerly, I have known Magpies to tumble well, but since they have been taken up by exhibiting fanciers, I suppose they have, to a great extent, lost the ability of tumbling, being bred merely as toy pigeons for the show-pen. The Magpie has undergone a considerable refining process during the last ten or fifteen years, and is now much fancied and bred. It is wanted small, with a "snaky" head and beak, showing very little rise or "stop," a thin neck free from gullet or throatiness, and narrow-shouldered. The beak should be white or salmon-coloured, and the eye-wattle and corners of the mouth of a reddish tint; the iris ought to be pure white or pearl-coloured. The marking is as follows: The head and neck should be coloured to a line across the lower part of the breast. Accordingly to the position of this line or belt the bird is "high" or "low-cut," and they are preferred "high-cut"; but the line ought to be straight and not "slobbered." The colour should continue from the back of the neck to the end of the tail, and blues and silver should not have white rumps. The scapular feathers must be coloured, forming a heart-shaped figure on the back called the saddle. The Magpie has to be clean-legged and smooth-headed; but a creasted variety exists abroad. The colours should be deep and rich; blacks should show a beetle-green lustre, and reds be uniform in tint to the end of the tail. There are also yellows, duns, blues, and silvers. Plenty of good birds have slightly-stained beaks, but they are preferred when free from any colour there.

The Helmet is another Danish or North German Tumbler, generally free from head-crest or feathers on the legs, but sometimes crested. It is similar in size and shape to the Magpie, and is pearl-eyed. The marking consists of a coloured cap or helmet, the lower line of which runs from the mouth through the eyes and then dips slightly to the nape of the neck. The tail, including its upper and under coverts, is also coloured. These birds are found in all the principal colours.

There are also pure breeds of Tumblers known as White and Coloured-tails. The former, of various colours such as black, red, and yellow, are self-coloured with the exception of a white tail, and the latter are pearl-eyed white birds, with black, red, or yellow tails. The Stralsund Tumbler is pure white, with pearl eyes and red eye-ceres, long in face and feather, and is considered to resemble the Falcon in the carriage of its wings, which it carries out from its body at the shoulders.

The Tumbler is greatly fancied and flown in India, Persia, and Central Asia, where, I believe, there are many varieties of which we know little or nothing. When resident in India many years ago, I have seen many flights of Tumblers and other pigeons being guided by flags from the house-tops. The Emperor Akbar, who was contemporary with Queen Elizabeth of England, amused himself with Tumblers and other pigeons, the account of which may be found in his "Institutes," familiar to Oriental scholars. Descriptions of several other varieties of European Tumblers may be found in my large work on "Fancy Pigeons."

Short-faced Tumblers.

The Short-Faced Tumbler was produced in England during the eighteenth century, and is the only original race or breed of pigeon that has been produced here, all orher kinds being only the improved forms of foreign varieties. This engaging and beautiful pigeon, in all its sub-varieties of colour, is possessed of considerable hardihood, though delicate in appearance. It is supposed to be the result of several crosses, extending over many years, but the record of its production has been lost.

The Short-faced Almond Tumbler has five properties, and to be entitled to the name of a standard Almond the ground colour must be yellow, of a sound tint, and not pale or grizzled with white through the feather. This yellow ground must be broken or mottled with black throughout the head, neck, and shoulders; the primary flights and tail must, in each feather, show black, yellow, and white, which is sometimes, though rarely, seen in cocks, and seldom, or never, in hens. There is naturally a sexual difference in the colour of the cock and hen. The Almond grows darker with age, taking generally three moults to come to its best, and then becomes too dark so that it never remains a standard bird for more than one or two seasons. A bird whose ground colour is nearly white, showing little yellow except in the hackle, is called an Almond Splash. The five properties are head, beak, eye, carriage, and colour. The head should be very broad, lofty and round, and should slightly overhang the beak, an appearance given to it from the forehead feathers growing out from the skull. Such a bird has a good "stop." The beak should be short, thin, and straight out from the head, with a very small wattle, resembling that of the goldfinch, and may not measure more than about ⅝in. from its point to the centre of the eye. Some birds have short thick beaks, which are not so desirable. The eye should be pearl-coloured, and neither cloudy, broken, nor dark; and the eye-cere should be very narrow. The feathers on the cheeks below the eyes should be somewhat puffed out, or "muffed," which adds much to the appearance of a good bird. Shape or carriage consists in an upright gait with head thrown back, the breast prominent, the rump rather full, and the tail carried over the wings, which touch the ground. The bird ought to walk on its toes, the ball of the foot being raised from the floor. Carriage is a sign of good breeding even in a a faulty bird, and without it an otherwise good one looks underbred.

The Almond-feathered Tumbler has several subvarieties, such as Kites, black in colour, with red-tinged flight-feathers, and sometimes considerably bronzed on breast and body, hence called Black Kites and Bronzed Kites; Duns, and yellow-breasted Duns, called Golden Duns; Red and Yellow Wholefeathers; and Reds and Yellows mottled, or splashed, more or less, with white, when they are called Red and Yellow Agates. When Almonds are bred together they are apt to throw bull-eyed white birds, and sometimes "bladder-eyed" young, that is, the eye, instead of being sunk in the skull, is outside of it, and covered by a filmy skin. Such must be destroyed, as they are useless. In breeding goldfish the same thing occurs, from probably the same cause. Both the Almond Tumbler and the golden-yellow black-spotted carp are tortoise-shell coloured, and when we find that in both birds and fish this colour breeds "bladder-eyed" young, it may be from the effect of their colour. Certainly, when there are plenty of black or silver-coloured fish, analogous to the Kites in Short-faces, mixed with the gold and black-spotted) goldfish, very few "bladder-eyed" young are produced; at least I find it so in my ponds where I breed thousands of them annually. The Almond, therefore, cannot, even if it is done occasionally, be long bred to its own colour, so Almonds are matched to Kites, Duns, Agates, or Whole-feathers, and this is how the breed is kept up; but the object is to breed good coloured yellow ground Almonds, and few are bred. The sub-varieties, however, when good in Tumbler properties, are of considerable value, both for themselves and for breeding.

The Short-faced Black Mottle is a distinct breed from the Almond. It ought to be marked on pinions and back like the Long-faced Mottle, and be in head, beak, eye, and carriage like the Short-faced Almond; but at present it is very scarce, and not found so good as formerly. The same remark applies to Short-faced Baldheads and Beards, to which many fanciers are now directing their attention, and no doubt in a few years they will be greatly improved. At the present time they offer an opening to the intelligent persevering breeder. — From "Pigeon keeping for Amateurs."

Clara: I have been to the theatre every night this week, and had a different escort each time. Fred: You should be more cautious, my dear Miss Clara. Clara: Cautious Fred: Yes; or ill-natured people will be saying you can't get the same man to go with you twice.

Home Notes.

A Seasonable Diet.

The question of summer diet is deserving of far more attention than the average housewife is disposed to give to it. Diet plays an exceedingly important part in the general condition of the body, and doctors are advocating more and more every year the dietetic as opposed to the drug treatment of disease. I wish it could be more widely recognised that the physical system either in health or disease, responds in almost a marvellous way to dietetic treatment. "What is one man's meat is another man's poison: is a trite but true adage, and the trouble is that so few people adapt their diet to their special needs. Occupation, environment, physique, climate and constitutional tendencies are all items which should be taken into account. Food which is admirably adapted for persons of very robust constitution, who live practically in the open air, and indulge in vigorous physical excercise, may be, and often is, quite unsuitable for delicate people of nervous organisations, who lead sedentary lives, and who are possibly handicapped with weak or debilitated digestive organs.

The subject of dietetics with regard to the various common ailments of everyday life is one which would occupy a great deal of space were I to enter upon it here, so that I shall confine my remarks in this article to the question of health in relation to summer diet. The important point to bear in mind is that all food is intended to serve the purpose of repairing waste consequent upon the continual changes which are going on in the tissues of the body, and to supply heat and energy. When the outside temperature is low, as in winter, it follows that more food is required than is the case in summer in order to produce the requisite amount of animal heat. Less bodily energy is as a rule, expended in summer than in winter, and, therefore, there is less necessity for so much nitrogenous food.

Nature herself is such a good judge of the necessities of the body that if we religiously followed her dictates we should choose a simple diet during hot weather. The stomach resents "stodgy" food on a hot day, yet by force of habit many people continue to eat such things as thick soup, rump steak, and suet puddings during the month of January. The amount of alcohol taken during the hot months of the year should be very much less than in winter. It not only produces heat, but a quickening of the circulation, and the consequent transmission of additional blood to the head. In very hot countries it is found to be dangerous to take alcohol. A friend who has just returned from Brazil tells me that while travelling through the country he was surprised to find that the custom of inviting people to take wine or spirits in the hotels or restaurants is conspicuous by its absence. Coffee seems to be the universal beverage, and there is probably a physiological reason for this, as it is well known to have sustaining powers, and, while being a mild stimulant, it increases kidney secretion, and cools the skin by promoting perspiration. Coffee also has a special stimulative action on the brain, and lessens the need for sleep after exertion, so that in a climate which by reason of its intense heat, has a tendency to induce lethargic qualities it is no doubt of great value. Army doctors have reported that in India spirits are very injurious, and that wine and beer, if taken at all, should be drunk in extreme moderation, and that in the hot stations and seasons entire abstinence from alcoholic stimulants should be the rule. Large quantities of iced beverages should be equally shunned. Pouring a great amount of iced liquid into the stomach when the temperature is above blood heat causes a dangerous shock to the system, and is productive of congestion of the pores. Iced drinks, taken in moderation, gently cool the body, and pleasantly lower the temperature, but they should be sipped slowly—not drunk hastily. If wine is drunk it is best mixed with an equal quantity of Apollinaris water.

Lemonade made from fresh lemons, barley water, and the various fruit syrups with mineral waters, are all suitable beverages for summer weather. Distilled water is excellent, as it is a powerful solvent, and eliminates poisonous matter from the system. It is particularly valuable as a preventive of many summer diseases, as dysentery, cholera, typhoid fever, malaria, and kindred affections are often due to drinking contaminated water. Tea will be found very valuable in cooling the body in hot weather. That the act of drinking hot tea should make one cool sounds like a contradiction in terms. Its cooling effect, however is due to the fact that it promotes the action of the skin, thus encouraging perspiration.

The quantity of meat which should be taken in summer is very much less than that required in winter. Fish and poultry are more desirable than butcher's meat, and in very hot weather barley soup, with plenty of green vegetables in it, followed by fish, daintily cooked and served, and a dish of stewed fruit with custard, would be a sufficient dinner menu for two days out of the seven. Green vegetables, fresh, succulent salads, especially tomatoes, and lettuce, may be freely eaten, and fruit, cooked and uncooked, should figure at every meal. Unripe fruits, or that entering the period of decay, should be religiously avoided, and in no case should the stone or skins of any kind of fruit be swallowed. This should be especially impressed upon children.—"Lady."

Kidden: I say, M'Noodle, are you superstitious? M'Moodle: Not at all. Kidden: Then lend me 13 shillings.

Treatment of Children.

— Fits of Temper. —

It is the excitable child who, as a rule, suffers from fits of what are called temper. But very often these storms arise from ill-health, when, just like grown-ups, the little one feels irritable and wretched, and on the slightest provocation comes the storm. The general health should be attended to; one should watch for the special events which make baby naughty, and, where it is possible, avoid them, or, if the temper is brewing, try to divert the little one's attention.

Bad habits and tiresome ways are so easily impressed on little children that we should try and protect them from the opportunities which we know bring out their special feelings.

— Teaching the Children. —

We never know what part of the day's experience will register itself indelibly on a child's brain. Therefore let no single opportunity pass of implanting useful ideas, and what you say to-day you may have to repeat to-morrow in another form.

No matter; it is by adding bit to bit that the idea finally grows solid in the little one's mind.

Even in the midst of hurried and absorbing occupations we should pause a minute to answer a searching question, not in a round-about, careless fashion, but in a manner that will enable the child to carry on the train of thought for himself.

— Concerning the Ear. —

Never meddle with the ear if a foreign body, such as a bead, button, or seed, enters, leave it absolutely alone, but send for a doctor at once. More damage has been done by injudicious attempts at the extraction of a foreign body than could ever come from its presence in the ear.

Never apply anything in the ear for the relief of toothache.

Never apply a poultice to the inside of the canal of the ear.

Never drop anything in the ear unless it has been previously warmed.

Never strike or box a child's ears; this has been known to rupture the drumhead and cause incurable deafness.

— Selfish Mothers. —

There is no more beautiful trait than unselfishness, and yet the number of selfish mothers who exist is simply appalling.

Mothers who walk up and down night after night with a fretful baby; mothers who spend their whole lives toiling and moiling for the children; who never have one moment to make themselves look nice or to rest or to read; such mothers are in reality more selfish than the butterfly mother who thinks three minutes spent in the nursery daily quite sufficient attention paid to her offspring; for nerves and health give way, the temper suffers, and the little ones don't realise that because mother does so much is sometimes the reason they have such a cross mother.

Therefore, mother, be really unselfish. Remember you are human. Leave something undone sooner than wear yourselves utterly out. Remember, you owe a duty to yourselves, to say nothing of your husband.

— Exercise for Baby. —

If baby's limbs are very puny and undeveloped, the following simple exercises will be found beneficial:—Take baby's hand and gently raise it to its shoulder and down again ten times. Repeat with the other arm. Next do a corresponding exercise with the legs by gently pushing the thighs down on the abdomen.

If the child is old enough, place two of your own fingers in its tiny palm and say, "Now push mother's fingers up to your shoulder; now push them down, all the while resisting baby's attempts slightly.

It will be found easier to accomplish the leg exercise by placing the hand on the underside of the thigh, saying, "Now mother is going to push your leg down on to your stomach; don't let her."

And, again, for the reverse movement, "Mother is going to put your leg straight again; don't let her."

In this way baby will derive profit and amusement at the same time.

Butter Scotch.

Place in a granite or porcelain lined kettle two cups of good molasses, one cup of sugar (either brown or white) and three-fourths of a cup of butter. Boil rapidly, stirring constantly, for about fifteen minutes. Pour into square, buttered tins, allow to cool, then turn carefully out on a board and mark the desired sizes (about $1\frac{1}{4}$ by 2 inches), then cut through and wrap each piece in waxed paper.

Tried Recipes

— Ribbon Jellies. —

One pint lemon jelly, half pint ustard flavored with vanilla, four heets gelatine. Divide the jelly nto half-pints. Color one bright ed with cochineal and the other ale green with spinach coloring. et a layer of the red in a mould; when firm, pour in a layer of the ustard in which the gelatine has een dissolved. When set, add a ayer of green, and thus continue ntil the mould is full. This makes very pretty bright mould when urned out.

— Prune Bonbons. —

One pound prunes, 1lb. sugar, alf pint water, some blanched al-monds. Cut the prunes and re-move the stone, inserting an al-mond. When the sugar and water ome to the boil, boil for five inutes exactly. Then stir in asin with a wooden spoon until turns into a white cream. Dip ach prune in, then roll it in de-ccated cocoanut. Let these dry, hen serve in dainty bonbon shes.

— Swansdown Cream. —

Half pint cream, three whites of g stiffly whipped, half pint of stard, flavored with ratafia or mon essence, ¼lb. macaroons, or voy fingers. Place these in a ystal bowl. Just before serving, ir the custard into the whipped eam, and lastly lightly stir in e whipped whites of egg. Pour er the macaroons and serve.

— Princess Cake. —

Four eggs, 6oz. castor sugar, z. of flour, one teaspoonful of king powder, carmine or cochi-eal coloring, quarter pint of eam for decoration. Beat the gs and sugar to a thick cream ith a whisk, beat in sufficient chineal to make it a bright imson, then lightly stir in the our and baking powder with an on spoon, adding vanilla for vor. Bake in a round sandwich . Whip the cream, spread over e top, force roses of cream round e edge, and decorate with small ver sweets and a few chopped monds.

— Washington Cake. —

Cream one-half pound of butter, d one pound of sugar and cream ain. When light and smooth d the yolks of five well-beaten gs, one cupful of flour and the grated rind of two lemons. Stir in one-half of a cupful of sour cream, to which has been added one-half of a teaspoonful of soda dissolved in one teaspoonful of boiling water, one-half of a pound of seeded and halved raisins well floured, one-quarter of a teaspoon-ful of salt and two and a half cupfuls more of flour. Beat well for several minutes, stir in lightly the whites of the eggs whipped to a stiff froth, turn into a greased pan and bake in a moderate oven. If about three inches thick, it will require forty-five minutes to bake.

— Frosted Fruits. —

Carefully drain all the liquid from preserved peaches, cherries, currants, or any other fruit which retains its shape. Roll the fruit in powdered sugar, and you have a dainty for luncheon or desert which will keep fresh for some time.

— Apricot Dumpling. —

Make a good, rich biscuit paste; roll out quickly and cut in pieces three inches square. Strain the juice from stewed apricots and put a couple of pieces in the cen-tre of each square of paste. Pinch the corners together, and bake a nice brown. Serve with cream.

— Ginger Snaps. —

One egg, one cup of molasses, one cup of sugar, one cup of but-ter, and lard mixed, one-half cup of boiling water, one level tea-spoonful of soda dissolved in water, one tablespoonful of ginger, flour enough to mould out rather soft. Roll out thin, and bake in a quick oven.

— Jellied Chicken. —

One chicken, one hard-boiled egg, strips of tongue or ham (op-tional). Cut the chicken into joints, cover with water, add a little vegetable for flavor, and simmer gently for three hours. Take up and cut into dice. Lay some slices of eggs and ham in a mould, put in the chicken meat, add four sheets of gelatine to half a pint of the chicken stock, sea-son, and strain in. When cold, turn into a silver dish and garnish with lettuce.

— Caledonian Creams. —

Two whites of egg, two table-spoonfuls castor sugar, two table-spoonfuls raspberry jam, two tablespoonfuls red currant jelly. Rub the raspberry jam through a sieve to remove the seeds, then color it brightly with cochineal. Melt the currant jelly and let it cool. Beat the white of egg to a stiff froth with the sugar, then gradually beat in the jelly and the raspberry jam. When it will stand in peaks, serve daintily in jelly glasses.

— Club Sandwiches. —

Spread slices of bread thinly cut with thin slices of cooked bacon; cover over bacon with cold roast chicken, also thinly cut. Cover chicken with salad dressing, just before serving, as if allowed to stand the dressing will liquefy. The bread, chicken, and bacon should be very thinly sliced, as otherwise the sandwich will be too substan-tial. No butter will be necessary. The bacon is best cooked in the oven. It should be thinly sliced, rind and smoked edge removed, and the bacon laid on a toaster set in a dripping pan, then into the oven. In cooking, the fat drops into the pan, and leaves the bacon crisp, dry, and flat in shape, instead of curled. This method of cooking avoids all the odour of frying. If the bacon is to be served with liver, the fat may be used for frying the liver. Sausages may be cooked in the same way, and if fried apples are to be served with them, the apples may be laid in the dripping pan so that they will be basted by the fat.

Worrying Women.

A great deal of precious life is frittered away worrying over trifles, and over things that cannot be helped Of course, sound nerves, and a good digestion have much to do with that philosophy with which we accept the discipline of fate; but nerves can be controlled, and digestion improved by a rational regard for rest, and proper diet. There is no such kill-joy in the home as the always fretting, complaining woman, who sees only the dark side of things, upon whose world, apparently, the sun never shines. Everything is wrong, and nothing is ever right. Husband and children are made to suffer for the shortcomings of circumstances, and there is for no one in the four walls of such a home one chance in a hundred for even the minimum of happiness. Many a woman of this distressed type began her married life a cheerful, light-hearted girl. Sometimes it has been physical suffering that has robbed her of her courage, and sometimes disaster, and bereavement which were almost too much to be borne. But nevertheless the pain is not eased, the calamity averted, the loss made good by repining, and murmuring. Some of the sunniest, and most heroic souls have been those who have been racked with torture from which there was no relief—bedridden invalids, and cripples confined to their wheeled chairs.

Concerning Headaches.

To attempt to banish all variations of headache by a single "cure" shows a child-like faith in medicine, but very little common sense. The first step towards curing a headache is to find out which kind of a one it is, and to devote one's energies to drive it away. The headache, which results from indigestion, is of frequent occurrence, and it implies overeating or unwise eating, and that when a woman finds herself afflicted with such a headache, she should proceed to cure it by fasting, and a mild cathartic, and sitting with her feet in hot water before going to bed.

The nervous headache is the kind to which women are most subjected, as it results from the effort to make the nerves no more than they ought to do. The first step in treating this headache is to drop work and worry, if possible, and draw the blood from the head by soaking the feet in hot water, and putting cold applications to the forehead and the back of the neck.

Agreat many mysterious headaches have their origin in over-strained eyes. This kind is cured only by giving the eyes a vacation or by the oculist. Of course, care in the use of the eyes is also a help. Reading, writing, or sewing in a dim or flickering light must be given up. The common practice of trying to read in jolting trains must also be discarded. The eyes must never be used too long at a time, and when there is much eye work to be done, brief rests, and bathings in hot water will ward off the dreaded headache.

The headache which is the result of exposure to colds or draughts or sudden changes is best treated by hot applications, hot water bags, and gentle friction of the place of pain. If this does not banish the headache in a day, then a severe illness is indicated.

The best way to treat headaches is to avoid them—to refuse to over-tax the eyes, the nerves, or the stomach, and to give attention to exercise, and bathing.

A Milk Paint That Will Not Wash Off.

The following item appeared in the Scientific American:—

"A use to which skim milk, sour milk, buttermilk, or even whole sweet milk is not often put is paint-making, yet this product of the dairy makes possibly one of the most enduring, preservative, respectable, and inexpensive paints for barns and outbuildings. It costs little more than whitewash, provided no great value is attached to the milk, and it is a question whether for all kinds of rough work it does not serve all the purposes of the ready-mixed paint, or even prime lead, and paint mixed in the best linseed oil. It is made as follows, and no more should be mixed than is to b[e] used that day: Stir into one gallon [o]f milk about three pounds of Portlan[d] cement, and add sufficient Venetian re[d] paint powder to impart a good color Any other colored paint powder ma[y] be used. The milk will hold the pain[t] is suspension, but the cement, bein[g] very heavy, will sink to the bottom so that it becomes necessary to kee[p] the mixture well stirred with a paddl[e]. This feature of the stirring is th[e] only drawback to the paint, and a[s] its efficiency depends upon administe[r]ing a good coating of cement, it [is] not safe to leave its application t[o] untrustworthy or careless help. Si[x] hours after painting, this paint wi[ll] be as immovable, and unaffected b[y] water as month-old oil paint. I hav[e] heard of buildings twenty years ol[d] painted in this manner in which th[e] wood was well preserved. My ow[n] experience dates back nine year[s] when I painted a small barn with thi[s] mixture, and the wood to-day show[s] no sign whatever of decay or dry-ro[t]. The effect of such a coating seems [t]o be to petrify the surface of the woo[d]. Whole milk is better than buttermil[k] or skim milk, as it contains more o[il] and this is the constituent which se[ts] the cemint. If mixed with water i[n]stead of milk, the wash rubs, an[d] soaks off readily.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide. Telephone, 1234.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

Garden Notes for February.

Cut off dead blooms, and keep the plants in better condition by so doing.

The white oleander is one of the pretty useful flowering trees that, planted alternately with the pink variety, would do well for a hedge in a big garden.

Grass verges should be used wherever possible. Nothing so enhances the beauty of a garden as the ribbon-like borders of nicely trimmed grass.

Tar water sprayed now and again on growing cinerarias will keep the foliage free from the leaf boring insect which disfigures the plant so. Boil a cup full in a kerosene tin of water, and then dilute to about 20 gallons.

Keep the asters moist. It is a great mistake to water this line of plants only once a week. Every day a little, is the plan. Asters do not like a check.

Bamboo blinds, oiled before fixing, will last for three years, as a covering for a bush-house. They require to be wired at short intervals, say, every 18 inches, to make them safe. Use a fairly thick wire, and staple it along the battens. Much better do this than grip the slender slits of bamboo under a long lath.

Still plant bouvardias. Purchase fresh, young potted stock, and transfer to growing quarters that are both rich and deep. Shade the plants for a week, keep them well watered, and you need have no losses. Bouvardias shift easily and seldom fail.

Cut flowers intended for sending to friends should be cut very early in the morning, and have their stems placed deep in water, so that the flowers may take up a big supply of moisture for the journey. Never pack blooms in dry wadding or dry paper. Everything which comes in contact with the blossoms should be moist.

Dahlias might easily be flowered in kerosene tins or butter boxes. One plant to a tin or box will be quite enough. Knock some holes in the bottom of whatever you are using, and put in quite two inches of big pieces of wood or coal ash, crocks, broken pots, or anything that will let the surplus water get away. In all the rest proceed in the same manner as advised for ordinary garden planting. ...

Chrysanthemums will now be growing strong. See that the lateral shoots are kept off the plants where only one or two flowers are looked for. In cases where several good sized blooms are wanted, pinch out the top of the plants to force two or three side shoots. These you bring on much as you would a single stem, by nipping off everything but the main growth. Suckers coming from the shoots should be kept down. Mulch the surface with old manure, and very little in the way of artificial fertilisers will be necessary for some time to come. Any water that is given will take more food down to the roots. Any leaves that you notice turning yellow or spotting should be taken off and burned.

— Cineraria. —

Seed of this beautiful plant may still be sown. Procure a packet of good seed from a reliable seedsman, probable cost about half a crown; you can get cheaper strains, but it always pays to get the best. Fill a box or seed-pan with fine, light sandy soil. Sow the seed evenly and thinly over the surface, and cover very lightly. Place a piece of blotting paper and a pane of glass over the pan, and the seedlings will show themselves in less than a week if the seed be fresh. One important point must be remembered from the beginning—never allow the direct rays of the sun to fall on the young plants.

When the seedlings have grown two or three leaves prick out into 5-in. pots, putting three or four in each. When grown enough to hide the top of these pots they may either be planted out into position in the open border or potted out singly into small pots, the latter method for preference. Keep well watered, if possible using rain water, and spray overhead.

Star Primulas.

Star Primulas are less formal than the ordinary Chinese Primula, and produce tier upon tier of their attractive flowers throughout several weeks, and in abundance. There are now many different colours among the Star Primulas, white, blue, and many shades of red. A small collection of Star Primulas forms a delightful display and the plants are just as easy to grow, if not easier, than the more formal large-flowered Chinese varieties. Seed should be sown now in pots or pans having proper drainage and filled with a compost of half leaf-soil and half loam passed through a fine sieve. Plenty of sand should be mixed with it, and some should be sprinkled on the surface so that the tiny seeds may be seen; the sower can then better judge how thickly he is sowing. A very light sprinkling of sifted soil is given as a covering, barely enough, in fact, to hide the sand. As soon as the plants are so large that they can conveniently be removed, they must be transferred with great care ("pricking off" this is termed) to other pots or pans filled with a light sifted soil as before. Place the seedlings about $1\frac{1}{2}$ inches to 2 inches apart. They must still have shade from bright sunshine and a gentle watering through the rose of a can when the soil appears dry. Put the plants singly in small pots before they begin to get crowded in the pans, and when they are well rooted in these pots transfer them to pots of 5 inches or 6 inches diameter, according to the vigour of the individual.

Mignonette in Pots, Boxes and Borders

To grow Mignonette in the ordinary way is not a difficult matter but it is not so easy to cultivate big plants that will bear very large spikes of blossoms. An ordinary bed of Mignonette always attracts attention, and is generally much appreciated ; but highly-cultivated plants form a very distinct feature in any garden. The seeds are small, cheap, and germinate quickly ; consequently, many cultivators make the mistake—a very common one—of sowing too thickly.

I daresay readers have noticed in their borders bare patches here and there in the large clumps of Mignette. Now some growers sow the seeds thickly in consequence, so as to have plenty of plants and thus avoid such bare patches. The latter are not, however, the result of thin sowing, but of the ravages of wireworm. The pest referred to is very fond of Mignonette plants and destroys them wholesale ; therefore, to avoid disappointment, intending cultivators must be sure that the soil in the beds and the composts for pot and box culture are quite free from wireworm before any seeds are sown; as it is not possible to protect the plants fully afterwards.

To be successful with the cultivation of Mignonette in pots it is necessary to provide a good clean compost : Loam, two-thirds ; leaf-soil, one-third ; with a peck of well-rotted manure and an 8-inch potful of coarse sand to four pecks of the loam and leaf-soil. Avoid using comparatively new loam. That which has been cut and stacked for six months is the best, and the leaf-soil must be half-decayed and rubbed through a 1-inch sieve. It is not necessary to sow the seeds in small pots and, eventually, repot the resultant plants in larger ones. Select 6-inch pots, put in some clean crocks, then a few leaves not too much decayed, finally filling the pot to within 1 inch of the rim. Sow about six seeds 1 inch apart and cover them with a little fine soil. The soil in the pots should be watered before the seeds are sown, but not immediately after the seeds have been covered. Place the pots in a frame if available. When the seedlings appear, thin out all but the three strongest in each pot, and keep the young plants growing where plenty of air can reach them. Pinch off the point of each plant when it is about 3 inches high. Three side shoots on each plant must then be retained ; thus the full complement of spikes of bloom in each pot will be nine. Careful watering, neat staking and, in due course judicious feeding will tend to the production of grand pots of fragrant Mignonette.

Practically the same cultural details must be followed when planting in boxes as advised in in the case of plants grown in pots ; only it would be advisable to allow more side shoots to grow on each plant. In this case it is more satisfactory to have ten plants in a window box 3 feet long than twenty.

In garden borders the soil must be deeply dug several weeks prior to the sowing of the seeds. Deeply-tilled soil is a great advantage, as finer plants are secured, and they last longer in a good flowering condition than is the case when the soil is only surface dug. Thin out the seedlings to 7 inches apart : then those left will branch out and completely cover the soil. Firm soil is essential to success.

Rose Mildew.

Mildew is very common on rose trees, and may be found in almost every garden. The disease attacks the leaves principally on the underside and causes them to curl up and become distorted. It also attacks the young, growing stems and the flower buds. On the latter it causes crumpling and frequently brown discoloration of the outer petals, while it also reduces the size of the flower. The fungus causing the trouble appears as a very thin dusty white covering on the shrface of the parts attacked. The dusty appearance is due to the production of myriads of spores that are able to germinate on healthy plants, and thus start the disease on them.

Some varieties of roses are much more susceptible to mildew than others, but this fact is of little use in preventing the disease from appearing in gardens, partly because it is not easy to obtain information as to what varieties are comparatively immune and what are not, but mainly because the best roses are often the most suscept ble, and unless immune varieties can be found with almost identical flowers, the more attractive forms will be planted whether they are immune or not.

Various measures have been recommended for the control of the disease. One method is to dust the plants with a mixture of 2 parts by volume of flowers of sulphur with 1 part of quicklime. This mixture should be put in a muslin bag and shaken on to the plants in the same manner as that in which other plants are dusted with Parish green. The treatment should be repeated about every ten days, until the trees are free from mildew. The powder adheres best when the leaves are slightly damp when the leaves are slightly damp with dew or from the effects of a light shower. Another method of treatment is to spray or wash the plants with a solution of liver of sulphur, scientifically known as potassium sulphide. This may be made by dissolving 1 oz. of liver of sulphur in 3 gallons of water. A suitable vessel to use is an old kerosene tin that has been thoroughly freed from oil by scrubbing with hot water and sand. Another solution, recommended by Massee, is that consisting of 1 part of sulphuric acid in 1,500 parts of water. For practical purposes, there should be obtained from the chemist a solution containing 1 part of strong sulphuric acid, and 9 parts of water. One ounce of this mixture should be added to one gallon of water contained in a clean wooden tub or in an earthenware dish. Both the liver of sulphur and the sulphuric acid solutions will scorch young leaves, if the mixture is too strong ; and the effect of their application should be carefully watched.

In addition to the two solutions already described, various proprietary substances are recommended for treating rose mildew, and some of them have been found to give quite satisfactory results. Directions for preparing these sub-

stances for use are as a rule supplied with them.

The actual application of solu-of fungicides often presents some difficulty, in a garden. The ordinary syringe, even when it is provided with a fine rose nozzle, does not usually give a spray that will adhere well all over leaves with a thin, waxy coating. Either the solution falls as minute, practically spherical drops on the leaves, or if the plants are further wetted the liquid runs into big drops which evaporate slowly, leaving a somewhat too concentrated solution on the leaves in some places and none at all in others. The drops of strong solution scorch the leaves, and on the other parts the disease is not affected. In either of the above cases the spraying is of very little use. A method that would probably be found far more satisfactory, and one that is quite practicable on a small scale, is to wipe carefully each of the diseased parts with a soft sponge dipped in disinfecting solution. The leaves should not be made too wet; all that is necessary is to leave a thin, continuous film of liquid over the surface of the affected parts. The application of liquid disinfectant should be repeated at intervals of about a fortnight, until the trees are free from mildew.

In addition to applying a fungicide, it is advisable to pick off and burn all dead leaves, dead buds, flowers or other parts killed or badly damaged by the disease, and to collect and burn fallen leaves lying beneath the trees. These measures, if carefully carried out, should prevent the fungus from doing any serious damage.

About Hardy Ferns.

To grow Ferns satisfactorily in a garden we must recognise what Nature has taught us, and choose a spot sheltered from sun and wind as much as possible, but otherwise with plenty of daylight; and we must also indulge them with a soil containing plenty of leaf-mould. Rocky slopes will have taught us also that something in the rockery line will help, but in making a rockery it should never be forgotten that the Ferns are the main ornament of it, and hence that the rocks, whether real or artificial, should not be mixed up with shells and corals, or similar things which are entirely out of place. To start a rockery, say, under a south wall, the ground should be well forked up, and as a foundation any broken brick rubbish may well be mixed with the subsoil to drain it and keep it sweet; if the soil generally be good garden soil, and not clayey, it will do as it is, though an addition of leaf-mould is always advantageous. The bed should be made nearly 1 foot higher than is needed, as it is sure to settle, and the rocks or burrs should be well bedded in irregularly, leaving spaces between for planting the Ferns subsequently. When finished, water well and let it settle; then plant the Ferns singly close under the edges of the rocks, so that their crowns are just level with the soil, but not covered. Water them well in, and the work is done. Care must be used in planting so that small growers are not hidden by larger ones when growth sets in.

— Ferns in the House. —

Ferns, like all other plants, will grow towards the light, and arrange their fronds to catch as much of it as they can, the result being a very graceful one; yet innumerable people, ladies especially, who grow Ferns indoors in windows will keep turning them round to face the company, i.e., turn their backs to the light. Now, as many Ferns are practically developing new fronds all through the growing season, and these fronds as they unroll bend towards the light, stiffening as they develop, a Fern thus twisted and turned about becomes in itself twisted and out of shape, and all its native elegance is spoiled. The best plan is to mark the pot itself, and keep the mark either to back or front as the case may be. Much as Ferns like water, it is not well to let them stand in saucers full of it. A good plan is to use a large saucer and insert a smaller one inside it in which the pot stands. The large saucer can then be kept filled and will supply the pot, not by soakage, but by percolation through the smaller saucer, a much healthier way. The more light, but not sun, the sturdier the Fern; no Fern will thrive in a dark corner far away from the window, and gas fumes are poison to the hardiest.

The Poppy Anemone.

These plants are easily raised Make the seed-bed of a fairly porous soil, and place it in an open part of the garden. The surface before sowing should be firm and level; moisten the soil before the seed is sown, which should be done broadcast, the seed being then covered with a thin sprinkling of sandy soil. After this make the bed smooth, and shade it from the sun until the seedlings begin to appear, when the shading material must be removed.

The Petunia and Its Cultivation.

This is one of our best florist flowers, and has many points to recommend it. It is easily cultivated by amateur gardeners, can be had in flower eight or nine months of the year, is good for pot culture, has a nice perfume, and, above all, it can be bedded out through our hottest summers, forming a mass of rich colors which is rarely exceeded by any other flower.

— Hybridising. —

There is no denying this is one of the most important parts in the cultivation of florist flowers, for without the aid of the hybridiser it would have been impossible to see flowers in their best state of perfection. The best time to do this is between nine and one on a warm day as the flowers have the greatest amount of vigor in them at that time. The flowers should be of nearly the same age; if not there is a tendency to throw back to the original. The flower that is to be operated upon should have the anthers taken from it before being quite open, so as to prevent self-fertilization. Some judgment is required in the selection of the plants, for very often a weak-constituted plant produces the best flowers (especially in doubles); his aim is then to cross on to a robust-growing kind. In the matter of the colors of flowers they ought to be clean and distinct; also even shapes should be used. The next thing is to tie a piece of twine round the bottom of the flower, and when the seed vessel has turned brown the seed is ready for gathering.

— Soil. —

It is well not to have any set rule in the quantities of soils to be used, such as two-thirds of one kind, quarter of another, and so on. The principal thing is to get the body first, which should be composed chiefly of good virgin loam of a sandy nature, using some cow manure three to four years old, peat, plenty of sand, and some burnt ashes from a rubbish heap, the whole to be well mixed. Leaf-mould is preferable to peat, but is not always to be had.

— Seed Sowing. —

If for green house culture the first sowing should be made in the first week of April, making the soil much lighter than used for potting. A seed pan or shallow box is best for sowing in; well drain it, fill to top with soil, make surface firm and smooth by pressing soil well down with bottom of a pot, after which put pan or box in some vessel up to the brim in water. When damp, sow seed and barely cover with soil, then put a pane of glass over the top and keep in shade. When the seeds have germinated remove the glass by degrees, but do not allow the soil to get dry. If water is required use a small syringe, because this does not allow the water to fall so heavily as to wash plants out of soil.

— Potting. —

In the first place, the pots should be thoroughly clean. Dirty pots are very often the cause of plants becoming unhealthy. Good drainage is essential to the plant; in fact, it is half the battle in growing any plant. First place a piece of concave pot over the hole, then some rough pieces of pots or bricks, and a few smaller pieces over these, covering all with some of the lumps that usually fall to the bottom of potting soil. Over-potting is to be avoided in this and many other plants, as the soil is liable to become sour before the roots can come through the ball, so advise small shifts. When the seedlings are fit to handle place them in two and a half inch pots, leaving the necks of plants clear of soil, which should be fairly dry. As soon as the roots are show, ing all round the ball shift into four-inch pots, potting moderately firm; but before doing this cut the point of central shoot out to make them stool or throw side-shoots, and this should be continued until they are in flowering pots. By this means bushy plants are obtained. They should be kept close to the glass, as otherwise they are inclined to run leggy. Plenty of light and air is essential. Pot again into five and six-inch pots, which will be large enough for flowering in (unless large specimens are wanted). When in these pots the shoots should be staked out individually, to form a well-shaped plant; the sticks to be thin, and kept out of sight as much as possible.

— Watering and Liquid Manure. —

Although the Petunia can withstand great drought, it likes moisture during the summer months, also occasional supplies of liquid manure, more so when confined in pots. Small doses, and often, is better than too much at one time. The best and safest manure to make liquid from is fresh cow-yard, but change of food is as beneficial to plants as to animals. Sulphate of ammonia is a good artificial manure, commencing from one quarter up to one teaspoonful to the gallon of water; but this must not be continued for any length of time, say, once a week for two or three weeks, then change to soot-water, cow manure, or Peruvian guano, which should be used in a dry state, putting a five or six-inch potful to an ordinary barrow load of fine soil, and applying to the top of pots after taking away a little of the top soil. Liquid manure is not required till the pots are filled with roots.

— Cuttings. —

The best time to strike these is in spring or early sumer; the wood is then fresh and full of vigor. If small side-shoots connot be had, a part of the plant should be cut back, and after two or three weeks the breaks will be put round the sides of pots or pans, ready to take off, when they may be in very sandy soil, then cover with from bright sunshine, and in about a some glass, keep close and shaded fortnight to three weeks they will have rooted; put into two and a half-inch pots, and treat as seedlings. Cuttings of flowering branches or old wood should never be used, as these will never make good plants. Seedlings are preferable to cuttings, as they are generally more robust than plants raised in this way. In perpetuating named or good kinds, cuttings ought to be taken often during summer months, so as to have young plants in stock. The old ones sometimes turn yellow, and are not fit for cuttings if left in pots through the winter.

— Diseases and Insect Pests. —

Of all the florist flowers the Petunia is the least attacked by disease, and this ought to be considered another point in favor of its more general cultivation. It sometimes happens that an old plant gets attacked by a rust or fungus if kept too wet. If we had nothing more than this to contend with, there would be little cause of complaint, but the slug, the snail, and worse than these, the sparrow, have the greatest liking for the Petunia. One remedy for the slug is to get some lime, and air-slack it before using; put some into a small flour-bag, and shake over the ground, about 8 o'clock in the evening. If a few particles of dust get on the slug it will kill it. The surest way is to hand-pick this, and the snail for a few nights. In regard to the sparrow nuisance, it is a difficult matter to

find a remedy. It is only while the plants are young that anything is to be feared from these pests.

— Planting Out. —

July and August is soon enough to sow seed for outdoor planting. When the seedlings are strong enough they may be pricked out in shallow boxes four inches apart, in sandy loam, and when nice plants, shift with a ball of soil to their flowering quarters, in sandy loam, enriched with rotten manure. Pinch the points of the shoots out as the plants grow, and mulch the ground to keep the sun from roots; also pick off decaying flowers, thereby inducing others to take their places. Little attention is now required, except to give water and occasional doses of liquid manure. After they have been flowering some time, one part of the plant should be cut back to within six inches of the roots, and when the young wood has grown three or four inches the other part is to be cut in the same way; by this means the flowers are produced on young wood again.

In closing this paper it will be noticed much stress is laid in the matter of hybridising, and although a great deal has been done by amateurs, it is to be hoped that they will still continue to take a greater interest in this part of cultivation. Not only do they raise their own seeds, but look forward to getting something superior to the original; and if not successful there is not the same amount of disappointment as if the plants or seeds were bought elsewhere. Again, it is an inducement to amateurs to love floriculture, which is considered the most healthy of recreations. There is one other point, and that is never to throw away the smallest seedlings in Petunias and a great many other florist flowers, as they invariably turn out the best, but a great many people would disregard this, and choose large plants, thinking they had more for their money.

Soot and Its Uses.

The value of soot as a manure in the garden does not seem to be so well known to Australian horticulturists as it is in England and America. With us it is often thrown away as of little or no value, but in older countries it is considered of great value in the cultivation of most kinds of fruits and vegetables. On analysis soot contains about 43 per cent. of organic matter, in which is about 5 per cent. of ammonia. It is to this that its well-known effects upon vegetation are chiefly to be ascribed. It also contains some gypsum and certain other mineral substances, more or less insoluble in water.

Average samples of the following manures will contain percentages of plant food as under:—As nitrogen 2[illegible].72 sulphate of ammonia, 10.03 [illegible]d blood, 4.75 shoddy, and 4.14 soo[illegible] [illegible]ual to ammonia 25.16 sulphate of am[illegible]ia, 12.18 dried blood, 5.77 shoddy, [illegible] 5.03 soot.

From some experiments made by Johnston and Cameron it was found that 50 bushels of soot mixed with 6 bushels of common salt produced larger crops of carrots than 24 tons of farmyard manure with 24 bushels of ground bones. Applications of soot to asparagus, onions, celery, peas, and other vegetables have been made with remarkable success.

Few manures are so eeffctive for fruit trees and bushes as soot, and it has been found in practice that hardly any manure colours fruits, from grapes to plums, so highly as a constant and liberal dressing of soot. It is a capital fertiliser for strawberries, raspberries, apples, pears, peaches, cherries, apricots, gooseberries, and currants; but soot should not be used for strawberries, raspberries, or grapes when these fruits are ripening, as it will frequently impart a disagreeable flavour.

It forms a capital dressing mixed with leaf-mould for poor lawns when moss is prevalent, or to cricket or croquet grounds, etc.; it sh[illegible], however, be applied in damp or rain[illegible] ther, otherwise it tends to burn the herbage. The same may be said of onions.

Soot has the power of destroying slugs and keeping off insects and other pests that attack vegetation. Insects and birds of all kinds have the strongest antipathy to soot. Overhead dressings to gooseberries and currants are excellent antidotes for caterpillars, aphides, birds, and other pests in the early spring and summer. One of the best remedies for gooseberry caterpillar is to give a liberal sprinkling of fresh soot early in the morning, when the bushes are damp—two or three handfuls to a good-sized bush, so as to make it quite black with soot. It is of no use unless the operation is done when the bushes are damp, so that it sticks on well. If it comes off by rain falling shortly after it must be done again. The soot acts as a manure afterwards, causing the bushes to make excellent wood for another year. Dressings of soot and lime mixed have long been known to be of service in checking turnip fly attack, if applied at theh right time of day—that is, when the fly is quiet in the morning or evening, or in dull, damp, or dewy weather, rather than in sunshiny time, when the insects are very active. A careful dusting with soot is effective in getting rid of aphides on roses.

Utilisation of Wall Space.

To those lovers of flowers who have but little garden ground at their disposal, the following novel utilisation of wall space may be interesting. Along the bottom of a narrow strip of back garden in the town ran a bare brick wall about 10ft. high. Some wire netting of a pretty fine mesh was strained from side to side of the garden at about 5in. from the bottom wall. The intervening space was then filled with good garden mould, mixed with which were seeds of Snapdragon (Antirrhinum), Wallflower, Canary creeper (Tropaeolum canariense), etc., the whole being well firmed down. Ferns and Ivy were subsequently introduced serving to hide the netting and bind the mould together, and what was once ten feet of blank wall has now become a miniature garden in itself.—Exchange.

"I beg pardon," said the reporter, "but are you Mr. Spudde, the potato king?"

"Yes, but I don't like that term," replied the magnate testily. "Oil kings and cattle kings and the like are so common. Call me a potatonate."

Bulbs in Fibre.

The question of cultivating bulbs in fibre is of growing importance. When once the process is understood, it is simplicity itself, and requires little attention. The utility depends both upon the potting material and the advantage of having the bulbs in vases without drainage holes in them, as in the case of ordinary flower pots. Furthermore, these vases are not porous like an earthenware pot, and no water or soil percolates through the bottom, and no moisture oozes out through the surface to wet or damage furniture or table covers in the drawing room or dining room, where the pots may be kept when in bloom. Even with the greatest of care flower pots stood in saucers soon rot table covers by keeping them continually moist.

Moss fibre has another recommendation, namely, that it is light and easier to obtain than loam in some districts. Commence the process of potting by rubbing the moss fibre so as to reduce it to a uniform texture without lumps. About 8lbs. of ground shell is mixed with each bushel of moss fibre and a few lumps of charcoal are put in the bottom of each jar to absorb impurities and keep the material sweet.

When obtained the moss fibre is dry and light, weighing about 20 lbs. per bushel, but it should be properly moistened before commencing to pot with it. The operator should pour about a gallon of water on each half bushel of fibre, using a rosed watering pot so as to distribute it. This is allowed to soak in until the fibre has increased in bulk by about one-third and feels just nicely moist without any water running away from it when squeezed in the hand. One gallon may not be sufficient, but that has to be determined by the discrimination of the operator.

When the moss and ground shell have been thoroughly mixed and properly moistened, put a few lumps of charcoal in the bottom of the vase, then 1 in. to 3 in. of fibre, according to the size of the vase, placing the bulbs on the top of this. After putting in the bulbs the proper way up the jar is then filled up nearly to the top with moss fibre and pressed moderately firm. There is a virtue in not making it too firm, because roots of bulbs are rather thick and have a difficulty in pushing their way through the fibre if too much compacted. The danger in this is sometimes seen in using ordinary compost, especially if the lower layer of soil is first pressed and then the bulbs placed on the top. A very large number of roots are pushed out, and if the fibre is too hard, the bulbs push themselves out of the jars with the fibre on the top. Having used judgment in this matter and potted the bulbs, the treatment otherwise is pretty much the same as with ordinary compost.

The next question is what to do with the jars that have been filled. A very common custom, and equally common mistake, is to place them in a dark cupboard or dark, airless basement or room. Bulbs are like other plants, they delight in a free play of air, and light is certainly necessary as soon as ever the leaves commence to show themselves, but till this has taken place they will be benefited by being kept in a darkened but airy position without symptom of dampness, for such a position will encourage root development. When the flower spike has grown about an inch the bulbs may then be placed where they will get plenty of light and air. All that we should impress upon readers is that bulbs should have all the advantage of light as soon as they are above the fibre.

The matter of watering will offer the most serious obstacle to beginners, but that is simple and easily surmounted by close attention. No water will be required immediately after potting if the moss has been properly prepared. It is after growth has commenced that the cultivator will have to pay strict attention to this. When the moss fibre is beginning to get brown on the top the bulbs should be watered, giving them just sufficient to moisten the fibre in each vase. If the operator has reason to suspect that water is lodging in the bottom, then the vases should be gone over and each tilted on its side so as to run out the superfluous water. The moss fibre itself, being like a sponge, retains enough water for all the needs of the plants, so that no superfluous water should be allowed to remain in the bottom of the vases, as it interferes with the proper work of the roots. During winter these vases will go a week easily without attention, and even then may not be dry, but the plant lover will inspect every jar at least once a week, and if water is necessary it should be given.

Hanging Baskets for the Greenhouse.

A greenhouse or shedhouse without a few hanging baskets filled with plants always presents a somewhat bare and unfurnished appearance, no matter how well the stages are filled. The first thing to consider is the baskets, and these are preferably made with stout galvanised wire or hardwood. They should be provided with three rigid wires, 1 foot or more in length and terminating in

a stout hook at the top for hanging up the basket. Chains are frequently employed instead of the rigid wires advised, but these are a nuisance when it is desired to take down or hang up a heavy basket, as a little practice will quickly prove. The baskets may be of almost any shape desired, but for general purposes the simpler the design the better. Wire baskets are generally made bowl-shaped and wooden ones square. Small boxes, with virgin cork nailed on the front and some holes bored in the bottom for drainage make excellent receptacles for hanging on walls, these, of course, being drained and filled with soil the same as pots.

Having decided on our baskets, we must now proceed to line them. Moss is frequently employed for this purpose, but, as it forms an excellent refuge for slugs and other pests, its use is not advised. Where peat is not available, good fibrous turves make an ex- good fibrous peat make an excellent substitute, these being used when the grass is just dead or in a partially decayed state. The general soil must next be considered, and, although a few special plants may need a particular mixture, the ordinary run of greenhouse subjects will thrive in the following: very fibrous loam two parts, peat or flaky leaf-soil one part, well-decayed flaky manure half a part, and sand half a part. Pull the loam and peat to pieces with the hands, leaving many pieces as large as hens eggs and making none smaller than walnuts. If some small pieces of charcoal be incorporated so much the better, and the whole must be thoroughly mixed before using.

We now proceed to fill the baskes with the plant or plants to be used. Generally speaking, one kind of plant to a basket is preferable, mixed baskets seldom presenting a pleasing appearance. If it is desired to clothe the sides of the basket as well as the top, small plants may have their roots pushed through the wires or wood at the sides, but this is not needed with creeping or naturally pendent plants; it also a nu sance when one wishes to turn the plant out of the basket. However, this is a point that must be decided by individual taste. Having selected our plant for the basket, it must be turned out of its pot, all drainage and sour soil removed from the base and top of the ball of soil and roots, and some of the side roots gently loosened with a pointed stick. This done place it in the centre of the basket if one plant only is to be used, taking care that the top of the ball is at least 1 inch below the top of the basket. Then work the soil well round it with the fingers, making the whole moderately firm as the work proceeds.

During hot weather an abundance of water will be needed, and at least twice a week the baskets should be taken down and thoroughly soaked in a tub of water to which a little fertiliser has been added. The work of filling the baskets, especially where a pendulous plant is being used, will be greatly facilitated if the basket is hung up at a convenient height; for smaller and more erect plants stand the wire baskets in a large pot or pan and the flat-bottomed wooden ones on the potting table.

Style in the Garden.

It is just as well to know exactly what we want to achieve when we take up the gardening hobby. The amateur does not realise quite so readily as he might that it is not a difficult thing to secure a delightful style and character in his garden if he will but work on the preconceived idea he has formed as to what he wants. Thus old-fashioned gardens delight him, and he decides he will have an old-fashioned garden for himself; but to secure it he must keep the idea in view in every operation he performs. He must know the characteristics of an old-fashioned garden, the manner of planting, the setting most suitable. Again, it may be simply a modern villa garden he wishes to have, and he should set himself to study what constitutes the best sort of modern villa garden.

I should like to add a few further remarks on the style of gardening I first mentioned—the old-fashioned garden—because it is such a general favourite. Of course this garden is easier to make when it surrounds a house that is likewise "old-fashioned," as the harmony, congruity and sense of absolute suitability will then be complete. In a beautiful old-fashioned garden I have in my mind there is not a bit of formal bedding. Every border and every bed (and the beds are many) are planted with a fine selection of hardy perennials, so that there is a grand blaze of colour and no formality. These beds of mixed perennials have a charm that is distinct and different from the charm of the more regularly planted border.—E. J. B.

Garden Scrapers.

In gardens of all kinds there is often a lack of those useful things, garden scrapers. These should be distributed freely over the garden at the end of borders, beds or at points where one is to reach the gravel walks, so that one will not carry the soil and weeds on to the walk. Anything might do for this purpose. A good way is to get two stout pieces of wood, say 2½ feet long and 3in. thick, and drive these 18 inches into the ground, 15 inches apart, wherever they are required. Get a saw and cut a small notch on the top of each post in the centre. Then get old pieces of iron or scythe blades and fix these into these notches. This is a simple operation, and provides a useful and effectual scraper.—Exchange.

Vegetable Garden.

Notes for February.

February is the shortest month, and it should be a busy one with those who cultivate kitchen gardens, as well as with those who grow fruits. Seed beds must be prepared, and some small lots of certain seeds must be sown, whilst the whole of the vacant land should be manured, dug, and prepared for reception of the main crops of vegetables. By thoroughly preparing the land and watering it, if possible, before the crops are forward enough to be planted out, or before they are sown, all the seeds of weeds and earlier plants will come up, and the young plants can be buried. This will save a deal of weeding when the crops are just put in.

Keep the Tools in Order..—The successful gardener always has clean, bright, and sharp tools. The spade and hoe will do double work, and better, too, if kept sharp. The rake should not have teeth bent into hooks, nor should the points of the tines be like the ends of mop handles. The bent fork is a most useful implement in the orchard or garden.

Pumpkins, &c.—The vines or runners of pumpkins, cucumbers, squashes, and melons should not be lifted or shifted. To prevent the wind blowing them about, stick in some pegs. Maize and pumpkins are sometimes planted together to protect the latter from the wind. The roots reach underground as far as the runners reach on the surface, therefore do not dig within a radius that could be reached by the runners in any direction. If the lateral shoots are too rampant, pinch off the points, but allow them three or four good leaves between the fruit and the end of each shoot. Do not use hard or brackish water.

Sow seeds of broccoli, cabbage, cauliflower, sprouts, kale, &c., in nursery beds. Plants raised upon the plains will thrive much better than those raised amongst the hills. The soil must be sandy, deep, and rich, and the seeds should be sown thinly in order to get strong plants with plenty of roots. Manure and dig the land at once, if vacant, for the plants later on.

Beans.—For the sake of experiment sow a few beans in rich, deep, sandy soil. Water the plants well when they appear, but never give more than the soil will hold in suspension.

Carrots and Parsnips.—Although the main crops should not be sown until April or May, a few early lots may be put in now for a chance crop and the land should at once be got ready for the May sowing. Dig the ground deeply, and pulverise it to the bottom. If any manure is to be applied, put the chief part deeply down and mix very old stuff with the upper soil. One ounce of seed will sow a row of 50 ft. The bed should be levelled and watered for three weeks to germinate all the seeds of weeds, which then can be dug under. Seeds sown now will need to be watered regularly.

Salad Plants.—Sow small beds of salad plants and prepare ground for larger sowings next month. If lettuces are kept regularly watered they will do very well. The beds should be deep, rich, and light. The various seeds do best when sown thinly in drills, because the hoe can be used to lighten up the soil, and it is easier to weed such beds.

Stir the Surface.—The surface must be fine and loose, to let in air and moisture from the air. Mulch of an inch deep of short litter will greatly help to keep the plants vigorous. If the soil is compact the moisture will all escape, the ground will become hot and dry, and the roots will suffer so much that the plants cannot thrive. But in hoeing great care must be taken not to go deep enough to injure the fine roots which ramify near the surface.

Onions and potatoes are easily bruised in harvesting, and then they quickly decay and spoil others. Directly they are taken up they should be carefully removed to a cool, shady place, else the sun will roast them, and they will spoil. Potatoes will escape the moth if they are covered with sand. Onions should be strung up or spread in thin layers in a cool, dry shed, kept dark if possible.

Sow swedes and turnips in small lots for early crops. Sow in drills 18 inches apart and thinly, as the plants must be 6 in. apart to make bulbs. One quarter ounce of seed will sow a row 50 ft. long.

Plant potatoes where the soil is not too dry; water them wherever possible. Plants should stand 30 in. by 12 apart, and setts should be put in 4 in. deep. The setts, if cut, should be planted eye downwards, and should be pressed down upon the loose soil, then covered up. If the land can be mulched it will be all the better. Manure may be buried below the setts and covered with an inch of finely-pulverised soil. It is well to have but one or two stems come up from each sett, as the potatoes are apt to be very small and numerous when there are many stems.

Peas and Beans.—Sow a few rows of broad beans and peas towards the end of the month for early results. The main crop may be sown a month later. Peas—One pint of peas is ample to sow two rows of 25 ft. length. The very early dwarf sort should be sown about half an inch deep, and the soil should be gently trodden after sowing. Then water the rows freely and watch for the plants coming up. Put in sticks at once and wind fine black cotton to and fro amongst the sticks to keep out the sparrows. The rows should be 30 in. apart, and the peas should be 3 or 4 in. apart. Most people sow peas too closely.

Sow celery seed about one-quarter inch deep on rich sandy soil. The surface must be quite level and smooth, and the seeds should be sown thinly in lines, so as to facilitate weeding and subsequent transplantation. One-sixth of an ounce of seed will produce enough plants for 50 ft. in length of row.

Fumigation for the Destruction of Scale Insects.

By A. A. Hammond, Orchard Superviser, in the Journal of Agriculture, Victoria.

For many years the Red Scale (Aspidiotus Coccineus) was known to be present in the Doncaster district. When first noted, only a few trees in one large plantation were infected. For a long time, the scale made no headway, and consequently growers took but little notice of its presence. About five years ago, however, the pest began to multiply and spread to an alarming extent, notwithstanding that every effort was made to destroy it by spraying. Emulsions of kerosene, crude petroleum and red oil were used, as well as several patent spraying mixtures; but it was found that, although spraying checked the pest for a time, it soon became as bad or worse than ever, and continued to spread. No matter how carefully spraying is done, only about 80 to 90 per cent. of the scale is destroyed on evergreen trees, because it is practically impossible to spray the underside of every leaf and fruit.

It may be well here to state that the red oil emulsion, 1 in 30, properly prepared, gave the best results. Scalecide also gave fair results, but is more expensive than fumigation, to be equally effective.

In 1909, soon after I had taken charge of the Doncaster district, the Red Scale was found in most of the citrus plantations. The Olive Scale was also causing a good deal of trouble.

When it was demonstrated to the Doncaster growers that fumigation was a thoroughly effective means of destroying scale insects, and the cost, in the long run, less than spraying, the leading citrus-growers adopted it.

To Mr. Ferdinand Finger is due the credit of being the first in the Doncaster district to demonstrate the efficiency and practicability of fumigation. Mr. Finger had five sheets made from strong unbleached calico selected by me. I supervised and assisted in the fumigation of several orange and lemon trees, on March 26th, 1909. These trees were infected with Red Scale, and, on examining the trees a few days later, all the scale were found to be dead. The charge used was 1 ounce each of cyanide and sulphuric acid to every 180 cubic feet of enclosed space. Mr. Finger and his son continued the fumigation at intervals during April and May. The Red Scale, on all trees treated, was destroyed; but the charge was insufficient to kill Olive Scale fumigated early in May. In all subsequent demonstrations, 1 ounce each of cyanide and sulphuric acid to 160 cubic feet was used, and was found to be effective against both the Red and the Olive Scales, as well as the eggs of the latter. It is inadvisable, however, to use the stronger charge when treating orange trees, unless they are treated on cloudy days, or at night, as they are much more susceptible to injury than lemons or mandarins.

The value of fumigation was further demonstrated in July 1909. In the latter end of June of that year, I discovered the San Jose Scale in a Doncaster orchard.

As this dreaded pest had not previously been found in the district, and was confined to one orchard, it was decided to have the infected trees fumigated.

The work was carried out in July. One ounce each of cyanide and acid to 120 cubic feet was used, i.e., about a quarter stronger than that used on evergreen trees. The scale was completely stamped out. It is now nearly three years since the trees were treated, and, although a careful inspection of the orchard where the outbreak occurred has been frequently made, no trace of the scale could be found.

Fumigation for Woolly Aphis was also tried in Mr. Finger's orchard in May, 1909. A charge of the same strength as that used for citrus trees was given. On examining the trees a month later, live aphis were found in the knots and excrescences, though examination immediately after treatment revealed no living aphis. These were, no doubt, protected in the interstices of the bark from the action of the gas.

— Fumigation Outfit. —

Sheets, either octagonal or square, made of strong closely woven unbleached calico, are recommended. The octagonal sheets require less material to cover a tree of a given size than a square sheet, but there is more trouble in making them up, and, consequently, the square sheets are more favored. A tree 13 feet high can be covered by a sheet 36ft. square, and one 11 feet high by a 30-ft. square sheet. It requires 72 yards of calico, double width, to make the former, and 50 yards the latter. The cost of the calico is about 1/3 per yard. Before making up the sheets, growers should measure the height of their trees, and the height multiplied by $2\frac{3}{4}$ gives, roughly, the size of the sheets required.

Loops of rope or rings should be attached to two sides of the sheet, about 15 feet apart, and equal distances from the corners. These are required in which to insert the poles when placing the sheet over the tree.

— Chemicals Required. —

Cyanide of potassium (the best quality) and sulphuric acid, are the chemicals used for generating the gas. Both are sold by avoirdupois weight, but the quantities given in the fumigation table are ounces avoirdupois and fluid ounces respectively.

This has to be taken into account when ordering the chemicals. There are but 9 fluid ounces of sulphuric acid in 1lb. avoirdupois, so, in ordering, it is required to get 16 lbs. of acid for every 9 lbs. of cyanide. The cost of the cyanide is 9d. to 10d. per lb., and sulphuric acid $1\frac{1}{2}$d. per lb. The cost of a charge for a tree 11 feet high by 11 feet in diameter is about 4d.

A pair of scales is required to weigh the cyanide, and a measuring glass for the sulphuric acid and water. The scales should be accurate and in good order.

— Placing Sheets over Trees, Charging, Etc. —

Two light strong poles 12 to 15 feet long, according to the height of the trees, are required. These should be pointed at one end, and have a fork at the other.

The forked end is wanted to insert in the loop or ring attached to the sheet; and the pointed end prevents the poles from slipping on the ground.

Two men can with these easily raise the sheet and draw it over the tree. The operators should, if there is a breeze, work towards it,

when the sheet will float over the tree without danger of being damaged. The sheet should be sufficiently large to allow of a foot or so to lie on the ground all round the tree. Soil is then thrown over this to prevent the escape of gas, except a few feet, which is left for the purpose of placing in the charge.

When branches of the tree lie on the ground, care must be taken not to cover them up when tucking the sheet around the tree, otherwise, scale occurring on these parts will not be destroyed, owing to the protection afforded by the tent and soil.

To ascertain the charge required, measure the height and diameter of the tree after the sheet is on. A rod marked plainly off in feet is used for this purpose.

Should the tree be very irregular in shape, it is advisable to take the diameter two ways, and then take the mean diameter. This also applies in measuring the height. It is usually sufficient to take the extreme height and diameter, but when the margin of safety is small, as is the case when treating orange trees in the day time, particularly large ones, a good deal must always be left to the judgment of the operator.

After the height and diameter have been taken, a reference to the fumigation table will show the charge required.

In preparing the charge, the water is first placed in an enamel or earthenware vessel large enough to hold the liquid without danger of boiling over. The sulphuric acid is then slowly added to the water, and the vessel placed well under the tree. When all is ready, and the tent closed down, with the exception of the place where the charge is put in, the cyanide is dropped gently into the vessel.

The operator should not put his head inside the tent when placing the cyanide in the acid, as the fumes are very deadly. As soon as the cyanide is dropped in, the sheet should be quickly closed down and covered. The sheet should be left on for 45 minutes.

As a certain amount of gas escapes through the sheets, it is advisable when fumigating for the operators to work towards the wind, so that the gas fumes are blown away from them.

It is inadvisable to fumigate when it is very windy, or when the sun is hot. There is also a danger of burning if the foliage is wet.

— Time for Fumigation. —

The best time to fumigate is in March. I have found that both the Red and Olive Scales are much more easily destroyed at this time of the year than when the cold weather sets in. This applies particularly to the Olive Scale, as in March and early April the majority of the scales are young and easily destroyed. The foliage, too, at this season is tougher, and not so liable to injury. On the other hand, in Spring and early Summer, the foliage is tender, the insects more difficult to destroy, and if a few escape destruction, they multiply during the late Summer and Autumn. The Red Scale can be effectively treated in Winter, but the ground is then sloppy, and the weather usually unfavorable.

Another objection to winter treatment is that, although the scale on the fruit is killed, it will not fall off, whereas, if done in early Autumn, the expanding fruit throws it off before picking time.

The tables which have been prepared will probably be sufficient for all requirements, but the required charge for larger trees will be found by squaring the diameter, multiplying by eleven-fourteenths then by eight-tenths of the height, and dividing by 160 for the stronger charge as given in No. 1 table, or by 180 as given in No. 2 table. For example, if a tree is 20 feet high by 18 feet in diameter, the formula is 18 x 18 11/14th by 20 x 9/10th x 1/160th, equals 28 2-3 nearly. The charge therefore is 28 2-3 ounces of cyanide, 29 ounces of sulphuric acid, and 87 ounces of water. It will be noticed that one-third oz. weights are often required in weighing the cyanide. As these are not always obtainable, a penny can be

used, which weighs exactly one-third ounce.

Observation of the result of fumigating trees varying considerably in size, show that small trees are rarely overcharged, whilst with large trees this often happens when the margin of safety is small. Great care, therefore, must be taken with 'the measurements in treating large trees, especially oranges, during the day.

It has been noted that, when the sheet has been taken off a small tree after being on for 45 minutes, the odour of the gas has been scarcely perceptible; whereas, in the case of large trees, the odour of the gas was strong.

The reason of this is that the area of the sheet enveloping a large tree is, in relation to the space enclosed, less than the area of the sheet enclosing a small tree. As there is an escape of gas through the undressed calico, the wastage of gas is relatively greater in small than in large trees.

In fumigating deciduous trees during winter for San Jose Scale, a charge one quarter stronger is necessary. This is found by multiplying the quantity of cyanide given in No. 1 table by 4, and dividing by 3. Sulphuric acid and water are increased proportionately. The cyanide should always be carefully weighed, and the exact charge given. A little more than the prescribed quantity of sulphuric acid can be given without harm, and this is done when small fractions are involved.

Cyanide is a deadly poison, and should be handled with great care. It should be kept in a secure place, and air-tight, when not in use. Sulphuric acid is dangerous also, and care should be taken not to allow it to come in contact with the clothing or the sheets. After handling the acid bottle, the operator should wipe or rinse his hands before touching the sheets.

When breaking the cyanide, which is in lumps, be careful than none gets into the eyes.

Always place the water in the vessel first, then slowly add the acid. When the vessel is in position under the sheet, gently drop the cyanide in. Hold the breath till the tent is closed down. Should the cyanide be very fine, it should be wrapped in paper, and paper and all put in. This prevents the too rapid generation of the gas. When large charges are given, it is advisable to place a board a few inches above the generator for the purpose of spreading the gas. The foliage immediately above the generator is sometimes damaged when this is not done.

Avoid treating orange trees on a warm sunny day, and never fumigate when the foliage is wet. Always dry the sheets well before storing them away. Fumigation can be done at any time of the year, but is safer and more effective in autumn.

There is no doubt that fumigation is superseding spraying as a means of destroying the scale in citrus trees. It is, in the long run, cheaper than spraying, and is thoroughly effective if properly done. Trees are invigorated by fumigation, but continual spraying injures them, more or less.

As has been stated, the San Jose was stamped out in the Doncaster district by fumigation. There is no reason why the Red Scale could not also be stamped out if the fumigation is as carefully and as thoroughly carried out.

Reinfection is often caused through leaving a few trees in the plantation which were thought to be clean. It should be remembered, also, that pear trees will harbor both the Red and the Olive Scales, and these should, when growing near citrus trees, be either fumigated or well sprayed with red oil, 1 in 25, in the winter.

Citrus trees have been reinfected through neglecting to treat infected pear trees which were growing among them.

Herewith, the opinions and experiences of the leading citrus-growers of the Doncaster district, who have adopted fumigation for the destruction of scale insects in citrus trees, are given :—

C. Gill writes :—"Besides getting rid of the scale, it improved the trees, also the fruit was far superior, commanding a better price on the market, and a readier sale. I may state that I am not quite free from it yet; but it was not the fault of the fumigation. I discovered that some of the branches that were on the ground got covered up with the dirt when packing round the tent; therefore, the fumes did not get at them.

FUMIGATION TABLE NO 1.

Height. ft.	Diameter. ft.	Capacity. cub. ft.	Cyanide. ozs. av.	Sulphuric Acid. fl. oz.	Water. fl. oz	Height. ft.	Diameter. ft.	Capacity. cub. ft.	Cyanide. ozs. av.	Sulphuric Acid. fl. oz.	Water. fl. oz.
4	5	71	¾	1	2	9	12	916	5 2-3	6	17
4	6	102	¾	1	2	10	12	1,018	6 1-3	7	19
5	4	57	¾	1	2	11	12	1,120	7	7	21
6	4	68	¾	1	2	12	12	1,221	7½	8	22
7	4	79	¾	1	2	13	12	1,323	8¼	9	25
5	5	88	¾	1	2	14	12	1,425	8¾	9	26
6	5	106	¾	1	2	15	12	1,527	9½	9½	28
7	5	124	¾	1	2	16	12	1,629	10¼	10½	31
8	5	141	1	1	3	9	13	1,075	6¾	7	20
5	6	127	1	1	3	10	13	1,195	7½	7½	23
6	6	153	1	1	3	11	13	1,314	8¼	8½	25
7	6	178	1¼	1½	4	12	13	1,433	9	9	27
8	6	204	1 1-3	1½	4	13	13	1,553	9¾	10	29
9	6	229	1 1-3	1½	4	14	13	1,672	10½	10½	31
6	7	208	1 1-3	1½	4	15	13	1,792	11¼	11¼	34
7	7	242	1½	1½	5	16	13	1,911	12	12	36
8	7	277	1 2-3	2	5	17	13	2,031	12 2-3	13	38
9	7	312	2	2	6	10	14	1,385	8 2-3	9	26
10	7	346	2¼	2½	6	11	14	1,524	9½	9½	28
6	8	271	1 2-3	2	5	12	14	1,663	10 1-3	10½	31
7	8	317	2	2	6	13	14	1,801	11¼	11½	34
8	8	362	2 1-3	2½	7	14	14	1,940	12¼	12½	37
9	8	407	2½	2½	7	15	14	2,078	13	13	39
10	8	452	3	3	9	16	14	2,217	13¾	14	41
11	8	498	3¼	3½	10	17	14	2,355	14 2.3	15	44
12	8	543	3½	3½	10	18	14	2,494	15 1-3	15½	46
6	9	344	2¼	2½	7	10	15	1,590	10	10	30
7	9	401	2½	2½	8	11	15	1,749	11	11	33
8	9	458	3	3	9	12	15	1,909	12	12	36
9	9	515	3¼	3½	10	13	15	2,068	13	13	39
10	9	573	3½	3½	11	14	15	2,227	14	14	42
11	9	630	4	4	12	15	15	2,386	15	15	45
12	9	687	4¼	4½	13	16	15	2,545	16	16	48
7	10	495	3¼	3½	10	17	15	2,704	17	17	51
8	10	565	3½	3½	11	18	15	2,863	18	18	54
9	10	636	4	4	12	11	16	1,991	12¼	12½	37
10	10	707	4 1-3	4½	13	12	16	2,171	13½	13½	40
11	10	778	4¾	5	14	13	16	2,352	14 2-3	15	45
12	10	848	5 1-3	5½	16	14	16	2,533	15 2-3	16	47
13	10	919	5 2-3	6	17	15	16	2,714	16¾	17	50
14	10	990	6¼	6½	19	16	16	2,895	18	18	54
8	11	684	4 1-3	5	13	17	16	3,076	19	19	57
9	11	770	4¾	5	14	15	16	3,257	20	20	60
10	11	855	5 1-3	6	16	13	17	2,656	15¾	16	47
11	11	941	5¾	6	17	14	17	2,860	17¾	18	53
12	11	1,026	6½	7	20	15	17	3,064	19	19	57
13	11	1,112	7	7	21	16	17	3,269	19¾	20	59
14	11	1,197	7½	8	22	17	17	3,473	21½	21½	64

I may state that one tree in the badly affected part got missed, and it was marvellous the difference in that tree and the ones around it."

Mr. Wm. Rieschieck, Doncaster, writes :—" I found the fumigation tables, which you supplied me with, quite satisfactory. The 'No. 1' table was quite right for lemons, destroying both the Olive and the Red Scale. I tried the 'No. 1' table for oranges in the day time, but found it too strong. The 'No. 2' table, however, d d no harm, and was, as far as I can see, effective. A lad and myself did 60 trees per day comfortably, using five sheets. The largest sheet used was 30 feet by 30 feet, which will cover a tree 12 feet high by 14 feet in diameter. And now accept my best thanks for helping me with the fumigation, as I knew nothing about it at the start."

Other orchardists have written in appreciation of fumigation, as carried out under instruction from the Department.

Gathering Fruit.

During the operation of gathering fruit great care should be taken to preserve the trees from injury as far as possible, writes a correspondent. I well remember some years ago being told by an old grower, not to gather two years' fruit at once. I laughed at the idea, being but a lad at the time, but have since found from experience that the caution is very necessary. All fruits are not ripe on the same tree at the same time; and, in consequence, they will not part easily from the stem. Therefore, unless great care be exercised the fruiting spur will be wrenched off with the fruit. The ideal manner of gathering is, of course, to leave those fruits which are not ripe until they do ripen, but all have not the time required to go over a number of trees three or four times, hence the necessity of enforcing the caution—"Do not gather two years' fruit in one."

FUMIGATION TABLE NO 2.

Height. ft.	Diameter. ft.	Capacity. cub. ft.	Cyanide. ozs. av.	Sulphuric Acid. fl. oz.	Water. fl. oz.
4	5	71	2-3	1	2
4	6	102	¾	1	2
5	4	57	½	½	2
6	4	68	2	1	2
7	4	79	¾	1	2
5	5	88	¾	1	2
6	5	106	¾	1	2
7	5	124	¾	1	2
8	5	141	1	1	3
5	6	127	1	1	3
6	6	153	1	1	3
7	6	178	1	1	2
8	6	204	1	1	3
9	6	229	1¼	1½	4
6	7	208	1	1	3
7	7	242	1 1-3	1½	4
8	7	277	1½	1½	5
9	7	312	1 2-3	2	6
10	7@	346	1¾	2	6
6	8	271	1½	1½	5
7	8	317	1 2-3	2	6
8	8	362	2	2	6
9	8	407	2½	2½	7
10	8	542	2½	2½	7
11	8	498	2¾	3	9
12	8	543	3	3	9
6	9	344	1¾	2	6
7	9	401	2¼	2½	7
8	9	458	2½	2½	7
9	9	515	2¾	3	9
10	9	573	3¼	3½	10
11	9	630	3½	3½	10
12	9	687	3¾	4	12
7	10	495	2¾	3	9
8	10	565	3¼	3½	9
9	10	636	3½	3½	10
10	10	707	4	4	12
11	10	775	4 1-3	4½	13
12	10	848	4¾	5	15
13	10	919	5	5	15
14	10	990	5½	6	18
8	11	684	3¾	4	12
9	11	770	4 1-3	4½	13
10	11	855	4¾	5	15
11	11	941	5¼	5½	16
12	11	1,026	5¾	6	18
13	11	1,112	6¼	6½	19
14	11	1,197	6 2-3	7	21
9	12	916	5	5	15
10	12	1,018	5 2-3	6	18
11	12	1,120	6¼	6½	19
12	12	1,221	6¾	7	21
15	12	1,527	8½	8½	25
13	12	1,323	7 1-3	7½	22
14	12	1,425	8	8	24
16	12	1,629	9	9	27
1	13	1,075	6	6	18
10	13	1,195	6 2-3	7	21
11	13	1,314	7 1-3	7½	22
12	13	1,422	8	8	24
13	13	1,553	8 2-3	9	27
14	13	1,672	9 1-3	9½	28
15	13	1,792	10	10	30
16	13	1,911	10 2-3	11	32
17	13	2,031	11¼	11½	34
10	14	1,385	7 2-3	8	24
11	14	1,524	8½	9	27
12	14	1,663	9¼	9½	28
13	14	1,801	10	10	30
14	14	1,940	11¼	11½	34
15	14	2,078	11½	12	36
16	14	2,217	12 1-3	12½	37
17	14	2,355	13	13	39
18	14	2,494	13¾	14	42
10	15	1,590	8¾	9	27
11	15	1,749	9¾	10	30
12	15	1,909	10½	10½	32
13	15	2,068	11½	11½	34
14	15	2,227	12 1-3	12½	37
15	15	2,386	13¼	13½	40
16	15	2,545	14¼	14½	43
17	15	2,704	15	15	45
18	15	2,863	16	16	48
11	16	1,991	11	11	33
12	16	2,171	12	12	36
13	16	2,352	13	13	39
14	16	2,533	14	14	42
15	16	2,714	15	15	45
16	16	2,895	16	16	48
17	16	3,077	17	17	51
18	16	3,257	18	18	54
13	17	2,656	14¾	15	45
14	17	2,860	16	16	48
15	17	3,064	17	17	51
16	17	3,269	18	18	54
17@	17	3,477	19 1-3	19½	57

Readers! **Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.**

How They Grow Cauliflower and Cabbage in N.S.W.

(By A. J. Pinn, Assistant Inspector of Agriculture.)

Owing to the absence of literature dealing with cabbages and cauliflowers and their cultivation, the following has been written as a guide to assist intending growers. The article deals with the growing of these crops in large areas, but certain recommendations can be modified to suit small growers, e.g., plants can be set closer in small garden plots, as all cultivation is carried out by hand, and there is not the same necessity for leaving so much space.

Many people are under the impression that the growing of these vegetables for Sydney market is confined to the Chinese; but such is not the case. In the vicinity of Sydney the market gardens are practically all controlled by Chinese; but in inland districts, where the gardens are not of such a mixed character—where practically only one or two varieties of vegetables are grown—the areas cultivated are chiefly worked by Europeans.

I.—CAULIFLOWERS.

Although belonging to the same family as the cabbage, the caulilower is not grown to nearly the same extent. This is due chiefly to the necessity for more favorable conditions during the growth of the plant than are required by other members of the brassicaceous order.

— Climate. —

It is preferable to grow this crop so that the flowers form in the cool months. The ideal climate is one in which the days are fairly warm and the nights cool, such as is experienced in the tableland districts.

— The Soil. —

The soils most suitable for their cultivation are alluvial flats that are fairly rich in organic matter, due to periodical flood deposits. These soils are usually fairly loose in texture, and, being situated on the banks of rivers and creeks, are generally well drained. As a rule the rental value of land of this character ranges from £2 to £4 per acre.

— Preparation of the Soil. —

The land should be well prepared, and this is best effected by working a rotation on the farm. A crop such as early potatoes could be harvested in time to allow of cauliflowers being planted out. Again, the cultivation during the growth of potatoes reduces the soil to a suitable tilth, and renders it free from weeds. By employing such a rotation the land is in use during the spring and early summer months. On account of the risk of reducing the amount of available moisture in the soil by the growing of a crop during the spring months, the practice is not recommended in districts where irrigation cannot be carried out and the rainfall is scanty. If it is desired to bare-fallow the land before planting, the soil should be ploughed in spring and cultivated during the summer months to kill weeds and conserve moisture. If it is intended to supply farmyard manure, this should be ploughed under when the spring ploughing is carried out.

— Seed. —

Good seed is of the utmost importance, and most growers are fully aware of this fact. The Chinese growers are very particular in selecting the most suitable strain of seed, very few of them, during the past season, paying less than £3 per lb. for their seed, whereas the bulk of the Europeans are paying about 12/ per lb.

Bad seed is dear at any price, because, no matter what attention is paid to the crop during growth, there will always be a large proportion of useless plants.

The members of the Cauliflower Association of Long Island (United States of America) placed so much importance on the selection of seed that they sent a representative of Denmark to select a crop from which seed was saved and purchased for the Association. The price charged for seed by the Association at the present time is £3 6/8 per lb.

Good seed should give a 90 per cent. germination, and should be kept not more than three years after harvesting. As there is little difference between one and two-year-old seed, it is advisable for the grower to buy his supply of seed one year in advance. This allows of a small portion being planted, so that its relative value may be gauged one year in advance.

— Raising the Plants. —

Make the seed beds where they will be constantly under observation, and where every care can be bestowed upon them. The beds should be wire-netted, as it does not take long for a rabbit or fowls to cause almost irreparable damage.

The beds should not be too wide; they should allow of half being weeded from each side. A suitable width would be about 4 feet. A bed large enough to produce plants for one acre when seed is broadcasted would be 20 feet long and 4 feet wide. It is always advisable to put in sufficient seed to raise more plants than are actually needed. This allows for loss by pests, faulty germination, and the transplanting of healthy plants only.

Two or three ounces of seed is more than sufficient to supply plants for one acre.

The best method of raising plants is to sow the seed in drills in the seed-bed, allowing 4 inches between the rows. Plants raised in this manner are usually sturdy, and differ from the lanky plants obtained from beds

where the seed has been broadcasted. The seed should be sown thinly, and each ounce of seed should sow a length of about 200 feet.

Another method sometimes adopted is to sow the seed broadcast in boxes, and when the young plants have two good leaves on they are pricked out and planted into other seed-boxes in rows about 1 inch apart, where they are left until they obtain their fourth leaf. After this the plants are transplanted into rows 4 inches apart in the beds, remaining there until ready for transplanting, being then about 4 or 6 inches high. This method is more often employed for cabbage when seed is raised during the winter months.

It is advisable to protect the seed-boxes during frosty nights by screening with hessian. The seed-beds should have a north-easterly aspect, and should be protected from the westerly winds.

The young plants should be watered occasionally in the seed-bed, but should not be forced so as to make them spindly.

Where water cannot be given to the seed-beds by soakage, or where there are no facilities for spraying, a satisfactory method to adopt is that employed by the Chinese, viz., to use a vessel attached to a long handle, for distributing water evenly and lightly over the beds. This method of watering is of use where the seed-beds are made alongside a running stream or irrigation canal. By using this appliance a great deal of labor is saved that would be necessary if the watering were done by means of a watering-can.

The soil in the sed-bed should be of good texture, and, if possible, a quantity of well-rotted farmyard manure should be incorporated. The organic matter supplied by the manure regulates the water-holding capacity, and also offers less resistance to the tender roots in their development. After the seed has been sown, it is advisable to scatter dry, finely pulverised manure lightly over the surface of the bed. This acts as a mulch, and prevents caking of the surface soil, thus offering no resistance to the young plants when germinating.

— Time of Sowing. —

In small gardens, cauliflowers can be grown over a longer season than is possible on large areas. The small gardeners are prepared to take risks that it is not advisable for larger growers to take.

For main crop sowings, the plants are put out from the end of December to the end of February, the seed being sown about six weeks prior to the time of transplanting.

— Transplanting. —

If possible, a dull day should be chosen, but with a large area it is impossible to choose so carefully. If the weather is very hot and the planting cannot be postponed, it should be done during the latter part of the afternoon. When this is the case part of the morning can be employed in lifting the plants in readiness for afternoon planting. The plants when lifted should be laid straight and covered with wet bags.

Unless the soil is very dusty and hot, the dibber holes are better left dry until after planting, but the roots should be covered with puddle (liquid mud) to prevent injury. After the soil has been pressed firmly round the roots, a quantity of water should be applied in order to give the plants a fair start.

The quickest method of planting by hand is to have a boy dropping the plants a few holes ahead of the man planting. The boy can then carry the plants in a bucket, so that the roots are constantly in puddle.

If the plants are somewhat large, it is wise to screw the tops off the leaves. This considerably reduces transpiration, and the roots are able to keep up the supply of moisture needed.

In America planting machines have been tried extensively of late, but the bulk of the growers have again fallen back to hand-planting, as they consider this method, although slower, gives more reliable and better results. One of these machines is to be used in the Moss Vale district this season. It is known as the "Bemis Transplanter." The machine requires a driver and two lads to drop plants. A barrel of water is carried, and at each click which marks the time for dropping a plant, about half a pint of water is delivered into the furrow. As the lads cannot always drop the plants just at the right moment, the water is usually allowed to run all the time.

— Distance of Plants. —

For early varieties the planting is usually closer than for the later varieties. For the former the distance is usually 3 feet x 2 feet 6 inches, requiring about 5,800 plants per acre, and for the latter 3 feet x 3 feet, requiring 4,840 plants per acre.

— Manuring. —

It is essential that soils for this crop should be well supplied with organic matter. Unless frequent applications of organic manures are made, the supply of this constituent is soon depleted, and the grower wonders why his soil does not pro-

duce profitable crops. The tendency of European growers is to grow these crops until the natural fertility of the soil has been considerably reduced, and then abandon cauliflower cultivation.

Most of the river flats are rich enough to grow several crops without the application of farmyard manure, and where the land is subject to periodical floods and benefits by flood deposit, there is scarcely any need for heavy manuring. The Chinese growers are constantly enriching their soils by the application of farmyard manure.

The following extract is taken from the Cornell University Agricultural Experiment Station's Bulletin, No. 292, being a treatise on cauliflower-growing on Long Island, where the area under crop approaches 3,000 acres:—

"The cost of horse manure is 1.50 dollars to 1.65 dollars a ton (over 6/), f.o.r. buyer's station. . . . A car of manure weighs anywhere from 25 to 35 tons, and most of a carload is required to dress an acre—say from 20 to 25 tons."

Surely if this money can be expended where the price of the produce is considerably lower than in New South Wales, the local growers would do well to follow the practice.

In addition to stable manure, the use of commercial fertilisers is universally adopted. The following is taken from Farmers' Bulletin No. 17, and is the recommendation of this Department:—

Manures for Cabbages and Cauliflowers.

These plants make heavy demands upon the plant food in the soil, and require very liberal manuring. The increased production obtained by manuring is, however, of considerably greater money value than the cost of manuring here recommended, which may at first sight appear rather high.

A.	Quantity per half-ton.	Cost. £ s. d.
Bonedust	9 cwt.	2 14 0
Sulphate of potash	1 cwt.	0 13 6
	10 cwt.	£3 1 6

Apply the above at the rate of 3 cwt. per acre when sowing or planting out. This will give a dressing of—

12 lb. nitrogen
60½ lb. phosphoric acid } per acre.
17½ lb. potash

The nitrogen and phosphoric acid in the above are in slowly available forms, and should be supplemented by a top-dressing (just before the heads begin to form) of—

B.

½ cwt. sulphate of ammonia
¾ cwt. superphosphate
½ cwt. sulphate of potash

This dressing will cost 17/ per acre, and there will have been given a total dressing of—

23 lb. nitrogen
74 lb. phosphoric acid
47 lb. potash

The total cost of the above applications would be £1 17/3.

— Cultivation. —

Cultivation between the rows with horse cultivator should be continued at short intervals, until the plants are too big to allow of it being carried on. If plants are not planted on the check system, and do not allow of cross cultivation, chipping-hoes will have to be used to keep down weeds, and establish the earth mulch between the plants.

— Tying. —

This is the practice of tying the outside leaves over the plant to protect the flower from weather influences. The system has its drawbacks, and is seldom adopted in this State. The chief difficulty in adopting this method is the trouble of determining whether the plants are ready to harvest. Some growers use a different colored band each day, so that when examining for market they can pick out the mature heads by the various colored bands. This method is a satisfactory one, if the development of the heads is even.

It is very important that the flower should be kept clean and white. While the head is small, it is well protected by the young leaves surrounding it, but when the coral head begins to grow rapidly, it must be covered in some manner to protect it from sun and frost. This is usually accomplished by breaking off some of the largest outside leaves, and placing them amongst the other leaves so as to properly cover the head, or it may be done by bending over some of the inner leaves.

— Harvesting. —

As soon as any of the plants become fit for harvesting, examination of the field must be made daily, and heads must be cut before they show signs of the flower stalks breaking away, thus giving the head an nueven appearance.

The cutting is usually done with a large knife, the plants being cut about 3 inches below the head, keeping all but the outside, dirty leaves to avoid damage in transit. The plants, when cut, may be carried to convenient heaps round the field; or, if the wagon or cart can be taken through the crop without damaging the growing plants they may be loaded direct.

The weight of cauliflowers, as marketed, varies with the size, ranging from fifteen to twenty dozen per ton.

— Yield. —

The yield varies considerably, according to the season and the variety grown. When good seed has been used, and irrigation has been practised, the yield from main crops can be reckoned at about 400 dozen per acre. This allows of very few misses, but this yield is frequently obtained under the above conditions, even when planted 3 feet x 3 feet apart.

— Returns. —

With cauliflowers selling at from 3/ to 3/6 per dozen, a yield of 400 dozen per acre would give a gross return of from £60 to £70 per acre. This return should allow of a substantial profit being made after paying all expenses.

The prices taken for the purpose of showing the probable return are the average prices obtained for medium grade. Prime cauliflowers would average at least 5/ per dozen, while the small ones would not bring more than 1/6 per dozen. The latter grade is often sold to the local pickle factories.

Care should be taken not to plant a greater area than can be properly attended to. By attempting too much many a grower has failed. The area

to be worked per man should not exceed three or four acres.

— Cartage —

The cost of transport by road can usually be estimated at 1/ per ton.

Veitch's Autumn Giant is, undoubtedly, the chief variety grown. It is a late variety, with long stem and large undulating dark leaves. The head is large, very white, and well covered by inner leaves.

Dwarf Erfurt (also known as Early Erfurt or White Queen) is an early variety, and is practically the only variety grown by the Long Island (U.S.A.) growers.

It is a plant of medium size, producing a fairly large, solid, heavy head of good shape.

Snowball.—This variety is a good early sort, and is much favored in the Goulburn district. It is a little earlier than Dwarf Erfurt, but not equal to it in quality.

Early London.—A fairly early variety, grown largely in the metropolitan gardens.

Broccoli greatly resembles cauliflower, and should receive the same treatment. It takes longer to mature.

(To be continued.)

The Eradication of the Blackberry.

By "Anti-Blackberry."

The blackberry is an old and well-known species of berry that at some time or other was brought to Australia by someone who evidently thought they were introducing a tasty berry to be made into jam and jelly and all those luxuries; but if that particular person were again to visit Australia he would probably find many men hard at work clearing this pest from their land, and some would have different ideas of eradicating this pest than others. Some would be grubbing deeply, others shallow, some doing it in winter, some in the summer early, some in the middle of summer, and some at the end, according to their ideas. In my opinion the man who starts at about the beginning of February, when the ground will be probably at its driest stage, with the shovel, where the plants are not too high, and just clipping them off level with the ground, will have them done with in less time than the man who grubs deeply or ploughs them in, or any of the different plans. I had a patch of about half an acre cleared right out in three years by going over it twice a year in the way mentioned, and fed down with sheep in addition. It was worked in this way:—About the beginning of February we went over the patch (which had been cut off short with hooks) with sharp shovels, and skimmed the ground clean and picked up the stems and odd roots with four-pronged forks, and burnt them on the ground. When the first rains came in March up came an army of young, tender shoots, and being very little grass, the sheep rather fancied these shoots and nipped them off pretty clean; in the winter the plants made very little growth, so we didn't worry them till about the middle of October, when we served them the same as before, and just when the grass was drying off our friends had some fine green shoots, which the sheep attacked, and stuck to them all through the summer, while they were making their growth, and in February again we went round with the shovels, and after the third year the army had dwindled down to very few, and now are well under control. Six years ago the blackberries were four or five feet high all over the patch, and to-day you would see very few blackberries, and the rest is covered with good grass. I cannot give the actual cost of clearing this patch, but feel confident that it would not be over half that of grubbing. This is not the only patch I have seen cleared in this way, and as all the others have been successful I feel convinced that it is the best way of clearing them out. It should be remembered that the tiniest root of a blackberry will grow in ground that is at all loose and moist, and by grubbing deeply to get the roots one not only loosens the earth and attracts the moisture but also divides the roots up. You take the main root out, but you leave several ends for the leaves to shoot from, which they do. By shovelling the ground clean the sun has a direct play on the ends of the roots, and bakes the ground hard and dry, and each year will see a few more perish with the heat of the sun. If you are troubled with this pest, try three patches—one, shovel clean; the other plough; the other grub deeply, and you will soon see which is most successful.

Mulching.

Cultivators, whether of fruit, flowers, or vegetables, should endeavor to minimise the effects of heat and drought by all practicable means in addition to supplying water. One of the most useful aids in this direction is the practice of "mulching," or covering the surface soil with a layer of litter or other suitable material to protect it from the direct effects of a hot sun and drying winds. When the ground is protected in this manner it retains moisture longer than when the surface is exposed, to the great benefit of the plants. Mulching is very serviceable in orchard practice, and more especially for the citrus family, a larger proportion of whose feeding roots lie near the surface. In the flower garden mulching will be of great benefit to the more delicate shrubs and plants, and more especially evergreens. It may be also advantageously applied to such late or autumn blooming plants as chrysanthemums, dahlias, etc. Among vegetables mulching will be of great assistance to crops of the cabbage family, peas or beans, and others to which it can be readily applied. The best material for mulching is horse dung, and next to that is litter from the stable; but these materials are not always available in sufficient quantities, and fairly good substitutes may be found in straw, grass, or leaves. Seaweed also makes a good material for mulching, and may be used with advantage whenever it can be readily obtained, as it not only effectively shades the surface soil, but enriches the ground with a considerable amount of potash. Care must, however, be taken in mulching, not to cover the ground too deeply, as when such is the case the warmth from the sun cannot penetrate the layers sufficiently, and the soil is cooler than is desirable. From three to four inches deep, when the mulch is applied, will be sufficient for most crops.

(For the commercial orchard, the only practical mulch is the soil mulch, obtained by frequent working of the surface to a depth of four inches or so.—Ed.)

Care and use of Manure.

This is a department of the business of farming which, like some others, has not in the past been given much particular thought or attention. The science of maintaining the fertility of the soil has probably been given less attention in this country than elsewhere, owing to the native richness of the soil. But as the country grows older, and the land is cropped year after year, the importance of maintaining fertility becomes more and more imperative.

All the farmer needs to do is to make the best use of the manure pile to convert it into a veritable gold mine. It requires intelligent handling to get the best results. The farmer should inform himself of the qualities of the manure produced by the different animals, the proper treatment of it, how to obtain the largest amount of the best quality, either by mixing, absorption, or otherwise, the qualities required for different kinds of soil, and the best methods of applying it. By the different treatments and applications of manure, the value of it to the land may be anywhere between 10/ and 40/ per ton.

It has been demonstrated by eminent authorities that manure commences to ferment and lose qualities that are valuable to the soil as soon as it is dropped. Soil, like water, is composed of small round particles and these qualities contain the food upon which the plants feed. These particles in a healthy and ideal state, are porous, and absorb nutriment from the rains and decaying vegetation, which they store up, to be fed to plant life as required. In worn out and neglected soil these particles become hard and solid, the pores are closed up, and it requires the action of fresh fermenting manure to soften them and open the pores and bring them into healthy action again. Here is where the great advantage of mixing fresh manure with the old is most noticeable. The best authorities recommend that manure be spread on the land as fast as made, in moderate quantities and frequently.

The old method of spreading the manure in lumps and chunks with a pitchfork is not good. If the season be dry the lumps will cut off the capillary attraction and thus the crop is dried up while if these same chunks had been properly distributed, instead of having had a bad effect in a dry season the effect would have been reversed. In other words, it would have opened up the little pores in the soil particles and made it possible for them to hold the moisture and throw it out when the plants most needed it. The ideal way to manure the soil is to place a small particle of manure in contact with every tiny particle of the soil. This can only be done by the use of a manure spreader. The modern manure spreader distributes the manure so much more evenly than it can be done by hand that a machine of this kind is almost indispensable on the farm. By dumping the manure direct from the stable into the spreader it will save handling. It takes but little time to haul the manure out each day and distribute it on the land while it is fresh and contains all its valuable qualities. If the supply is limited it is all the more essential that it be spread as soon as possible, with less to the acre and covering more acres.

If the manure cannot be hauled every day it should at least be kept under cover. A place should be arranged so that the liquid manure could be drained where it may be thrown back on the manure pile. Thus this part which is more valuable as plant food than the solid will be retained. The manure pile should not be allowed to heat and burn up. When it commences to heat it should be pitched over and water applied so as to prevent the loss of the valuable constituents by evaporation. The manure pile is too valuable to be neglected, and, as above stated, if properly treated it gives a profit every year.—Exchange.

Water for Bees.

By F. R. Beuhne, Victorian Bee Expert.

Few beekeepers are aware what amount of water is required by a colony of bees during the summer months, and how important it is that a permanent supply should be available within a reasonably short distance of an apiary. As a general rule, bees are left to themselves to get their supply of water wherever they can. There is usually a natural watercourse, dam, or waterhole somewhere in the neighbourhood, and if permanent, and within a few hundred yards of the apiary, such sources answer well enough. When, however, water is not permanently available within a quarter of a mile, it is greatly to the advantage of the apiarist to provide an artificial supply as near the apiary as convenient. I do not think that the time occupied by the bees in carrying water over a longer distance need be seriously considered, but the greater liability of being caught by birds, and insects, blown down during strong winds, or caught in rain-squalls during the longer journey is a serious matter. At the margins of dams, and water-holes hundreds of bees are often destroyed within a few minutes by cattle or horses stamping them into the mud or swamping them through the plunging of the animals into the water. Where many bees are kept, and the water supply is limited, they become a nuisance to stock, and sometimes a source of ill-feeling between neighbours in consequence. Bees are also very annoying about the apiarist's own home, round water-taps, tanks, and the drinking dishes of poultry, when the weather is hot, and any other supply of water rather far from the apiary. The writer was confronted with all the troubles enumerated when first establishing his apiary in its present location; but an automatic artificial supply close to the apiary has overcome these difficulties, and has now been working continuously for fourteen years without a hitch.

The water is obtained from the roof of the honey house, and stored in two tanks of 1,000 gallons each. An iron water-pipe, laid underground (18 inches deep) so as to keep it cool in summer, conducts the water to the drinking troughs, which are at a distance of about 100 feet from the building, and the same distance from the nearest hives. This distance is necessary, otherwise the bees, when flying to and from the water, interfere with work in the apiary, and also cause confusion at swarming time. There are two drinking troughs, they are placed on a stand at a height of 3 feet from the ground, in order to prevent poultry going to them, and to keep drifting leaves, and other material out as much as possible. Each trough measures 36 inches x 24 inches inside, with a depth of 6 inches, and consists of a frame made of 6 x 7/8 white Baltic flooring boards, with a bottom of 6 x 1/2 lining boards. It is lined with plain galvanized iron, No. 26 gauge, neatly fitted inside the wooden casing, to which it is secured at the top with fine tacks. It is better to have two or even three of such troughs instead of a large one of the same surface area as the two or three combined. If only one large trough is used the bees are too much concentrated, and a good deal of fighting and stinging takes place occasionally. It is, therefore, better to have several troughs a little distance apart, and if they are placed on the same level and connected by means of a piece of garden hose attached to a stud at the bottom of each, one stand pipe, with automatic tap, will supply them all. On the top of each trough floats a raft, upon which the bees alight to drink, and it is so constructed that they cannot drown, and even dead bees cannot drop into the water and thus pollute it. The raft is made of slats of 1/4-in. lining boards, 35 3/4 inches long, 15-16th inch wide, and 1/4 inch thick. The edges on the upper side are planed away at an angle of 45 degrees, so that when the slats are placed side by side they form V-shaped gutters, with an opening 1-16th inch wide at the bottom. Twenty-four of these slats are nailed on to three cross-pieces of 7/8-inch flooring board 23 1/2 inches long and 2 inches wide, in such a way that the thin bottom edges of the slats are 1-15 inch apart. The raft is then fitted into the trough, and dressed till a space of not more than 1/4 inch remains all around between the raft, and the lining of the trough. To keep the raft always at the proper level, that is, with the water not higher than about 1/2 inch between the slats, air-cushions are fastened underneath the raft, one at each end. They are made of light zinc, such as the lining of piano or drapery cases. Fold a piece of this material, cut to the correct dimensions, over a piece of wood 35 inches x inches x 1 inch, solder the joints, and after withdrawing the board, also the end. It may be tested as to being air-tight by pressing it under water to see whether air-bubbles escape; if so, there is a leak which has to be re-

soldered. In soldering zinc. raw spirits of salt, diluted somewhat with water should be used, not killed spirits (chloride of zinc); this rule also applies to galvanized iron. The solder-iron should be clean, well faced with solder, and only just hot enough to melt the solder, but not the zinc; this is only possible if the solder is of good quality. If the air-cushions raise the raft too high at first the latter should be weighted down to the proper level by means of small stones evenly distributed, and as the wood becomes saturated with water they may be removed as required. The raft of the trough, which is under the stand-pipe, has an upright iron rod pivoted to it in the centre. This rod connects by means of a hinge-joint with a lever fastened to the head of the water tap, which is screwed into the stand-pipe, so that the cone of the tap is in a horizontal position, and, therefore, lowering the lever will open the tap, and raising close it. No dimensions for rod, and lever can be given, as these depend upon the height of the tap above the raft, its distance from the centre of it, and the size and passageway of the tap itself. The measurements of the rods and the angle of bend in the tap lever can, however, be easily ascertained. The tap should be completely shut when the raft is within an inch of the top of the trough, but should begin to open as soon as the raft sinks, and draws down the lever. when the water level is reduced by the bees drinking.

Cultivation.

The proper cultivation of the orchard should begin some time before the trees are planted. Land must be in good tilth to grow trees successfully. Trees will live and sometimes grow in sod or in hard, lumpy or baked soil; but a passing glance at any two trees or lots of trees—the one planted in well worked land, the other in soil equally suitable for orchard purposes, but in poor physical condition will convince anyone that trees will not prosper in any old place, and that it pays to get your land in good condition before planting.

If possible, raise a cultivated crop on the area you intend to plant to trees the following spring, and then see that this crop gets cultivated. If this is not possible, deep ploughing with thorough cross discing, and harrowing will probably secure the required fineness, and depth of soil.

This preliminary preparation of the soil will show results in the orchard as the years go by. One effect will be to deepen the soil, thereby creating greater foraging, and roothold area for the trees. The roots of a tree will follow the lines of least resistance. If the soil is shallow, the roots will radiate close to the surface of the ground where every passing of plough and harrow will injure them, and where drought first affects the soil. If the soil is in good tilth the roots get started right at the proper depth, forever out of the way of injury from plough, cultivator or drought.

Another result of this preliminary preparation will be to fine the soil, thus presenting greater feeding surface for the roots, and creating greater moisture holding capacity. Moisture comes from the rains. The soil must act as a sponge to absorb it when it falls, and hold it until needed. A soil in poor physical condition absorbs, but little moisture as it falls, is soon streaked with cuts, and gullies from the wash, and soon suffers from lack of moisture, even if a dust mulch is secured at once. It is surprising how much water a soil in good tilth will absorb before it becomes saturated. This difference in moisture holding capacity of the two soils may nicely be illustrated as follows:—

Take two pails—bore a hole in the bottom of each—fill one with sand, the other with good sized pebbles—pour slowly a gallon of water into each pail then measure the amount of water that runs from the bottom of each. There will be precious little in the one instance, and almost the entire gallon in the other. Yet a particle of sand does not absorb moisture in a greater degree than a pebble.

The rains provide moisture for the orchard. The business of the orchardist is to prepare his soil so that the moisture may be conserved for use as needed.

Begin to cultivate as soon as the orchard is planted. Cultivate to improve the texture of the soil. Rocks may contain abundant plant food, yet very few plants are able to get their food from rocks. Hard, lumpy soil certainly contains the chemical elements necessary to support trees, yet the physical condition of the soil is such that trees will not thrive there. Cultivate to fine the soil, to keep it mellow so that your trees, through their roots, may avail themselves of the quantities of plant food stored there.

Cultivate the entire surface of the orchard. At first, of course, the roots extend through but a small area. If the entire soil between the trees is kept in good physical condition the extension of the roots is facilitated. In any healthy tree the area of the root system is as great or even greater than the area of the top. A fine root system is essential to the success of the tree. A glance at the tops of the trees in any healthy orchard a few years old will indicate that the roots penetrate to all parts of the area between the trees. Keep all the soil in good condition to accommodate the roots, and nourish the tree.

Cultivate to conserve the moisture with which the rains of spring have saturated the ground. Remember, there is sufficient moisture in the soil to last the tree the entire growing season, if this moisture is properly husbanded for use as the tree needs it. Every child knows or should know that the dry, soft earth on the top of the ground created by the passage of harrow or cultivator acts as a non-conductor of moisture, and thus prevents the evaporation of the moisture already in the soil. ...

Do not wait until the ground is dry, and baked befote you start your harrow or cultivator. It will do no good at that time. Cultivation never put a drop of moisture into the soil — it merely conserves what is there. When once the soil becomes dry, rains must supply moisture. If there is a season of drought the trees are sure to suffer, and do so much more when there has been no cultivation.

Cultivate about every ten days, so as to preserve this dry mulch on the surface of the ground. Cultivate also after every rain so as to renew this mulch. Never let the surface of the ground in your orchard become hard or crusty during the growing season.

Continue this cultivation as long as you wish the trees to grow, or as long as they may safely to permitted to grow. Watch the growth of your trees, and your season, and govern yourself accordingly.

Cultivate, cultivate, cultivate spells success in an orchard. A tree may maintain itself for a time in sod or among uncultivated crops if moisture conditions happen to be favorable; some one may point to an odd tree growing under such conditions, and bearing fruit; but the wise orchardist will not be misled by these exceptions. He will bear in mind that a modern commercial orchard is an artificial product, and that he is endeavoring to secure an abnormal product in the way of fruit. He will maintain the artificial condition of the orchard, not the natural conditions of the forest.

How and When to Spray for Codlin Moth.

Paper by W. E. Hargreaves, Port Elliot, Branch of Agricultural Bureau.

The reason why I write on the codlin moth, is, not that I know all I should do on the subject, but it is to try and get my neighbours to spray to time. Anyone can read the rules of spraying and when to spray but they do not take the trouble to spray their trees to time. I think that now we have inspectors going about, they should not only tell the fruit-growers what and when to spray, but should see that they do spray, and spray to time. I have asked several who grow fruit, if the inspector has been to see them, and the answer is "No, it is too early yet," when it should have been done four or five weeks before. Where does the fairness come in, when a few try to keep their orchards clean from moth and others a mile or so around are allowed to breed them by the thousand? I do not claim either, that my orchard is the only one about that is almost clear from codlin moth, or that I have any special knowledge on the subject of spraying, but it is my belief that every owner of an orchard can have his fruit almost free from moth. To have this he must give the closest attention to all the details of thorough spraying, especially the first one, and he must be prepared to do it to time. I might say that the three essential things in getting rid of the codlin moth are :—to use the proper spray mixture, (that is arsenate of lead) — to spray in time, and to spray thoroughly. The reason I prefer arsenate of lead, is because it can be used as freely as wished without danger of injuring the tree, or young fruit. The second essential, spraying in time, applies mainly to the first spraying and this should be done as soon as the petals of the flowers fall off. In a very few days after the petals fall the calyx closes, and it is necessary to fill the calyx cup before it closes with the poison spray. If we want to keep our fruit clean from the moth it is necessary to make preparation before the tree throws off its blossoms and then we can spray in time to fill the little fruit cups, before they close. Very few of our fruit growers spray at the right time, and I'm sorry to say many of them do not spray at al.. Some of them that do go through the performance, only half wet their trees. This brings us to the third essential, and that is spray your trees thoroughly. The first thing needed, is a good spraying outfit, one with the agitator, to keep the mixture from settling on the bottom of the spray tank. I like a large spray pump for it has plenty of force. This I believe, is essential for when the mixture drys a sufficient coating of poison is in the cup, and on the little fruit to kill the young moth. I am sure we cannot keep the codlin moth in check, if we do not spray at the right time. To gain success we must wet the tree, every limb, leaf, and fruit and not stop; until the trees drip. Learn to watch the little fruit cup, and see that they are all full of the spray liquid. I use 2½lbs. of arsenate of lead to one hundred gallons of water. Always weigh the lead, never guess the weight, and then you are on the safe side. I find it better to use it on the weak side, and fairly wet the tree than to have it strong, and always be frightened to spray too long in fear of harming the trees. If the first spraying is done at the right time there is not much need for a second or third time, as there will not be later hatchings. If my orchard was dirty with moth I would spray two or three times for a year or two. Never take old empty cases to your orchard without first dipping them in boiling water for a few minutes. When we all learn to do our first spraying to time, and do it thoroughly, then we will hear less about codlin moth. Give me arsenate of lead, rain water to mix it with, and a good spray pump then the moth will not make me lose any sleep. I find from 2 to 2½lbs. of arsenate of lead just as effective as a stronger mixture. I have heard of it burning the foliage of the tree if used too strong, I have used as much as 4 lbs. to 1 hundred gallons of water, and have wet the trees well, and have never seen the slightest damage to the young foliage. It is not enough to know how fungus and moth act in attacking plants and fruit. While that is essential it is by no means sufficient to enable the fruit grower to know know what to do to eradicate it. We must know how and when it reproduces itself. No fungus moth, or insect comes spontaneously any more than do weeds or grass. It is a well established fact that weeds are more easily killed if taken while young, than after they gain full headway, and it is just the same with the codlin moth or any fungi. It is important, therefore that the fruit grower should know when and where it begins its work on the fruit trees, and for this is the best time to spray in order to kill the largest number. If he knows their habits he can kill them with arsenate of lead mixture that is as long as they have not penetrated the fruit. When that is accomplished, they are safe and snug inside the fruit, and it is useless to spray. If this is so, is it not the most important thing that the fruit grower should know as much about it as possible and it will pay him to give some time to study the habits of all fungus diseases, and the codlin moth. Why should fruit growers not possess all such knowledge? If they will not study the habits of their enemy, they have the Advisory Board and inspectors as a storehouse of knowledge to help them, and it is free for the asking.

The Farm

The Cause of Half our Troubles.

"Fifty per cent. of present day dairying troubles are caused by the failure to cool the milk immediately after milking."

The N.Z. Dairy Commissioner, in an address to the dairymen of Auckland the other day, made the stated quoted above, and as he is generally considered one of the soundest men in Australasia on all matters appertaining to dairying, his statement is worth more than passing attention. If we accept his statement as true, and we are prepared to admit that there is a good deal of truth in it, then 50 per cent. of the troubles of the milk suppliers of this colony can be cured in one act.' If 50 per cent. of the present-day dairy troubles are caused by the failure to cool the milk immediately after milking, then it is a fair thing to ask suppliers to cool the milk. For those factories that have freezing machines this is not a matter of great difficulty, for if an ice making plant be added the cooling is an easy matter. Milk is best cooled in cylindrical coolers, containing a mixture of one part salt and three parts ice. This mixture in a few moments will be at a temperature of several degrees below freezing, and a few pounds of ice, when mixed with salt, will cool a very large quantity of milk. But there is the question of expense to be borne in mind, and unfortunately, in many instances this is likely to prove a fatal barrier. However, to those of our readers who are interested in this question, perhaps the ice-salt mixture as a means of bringing milk to the lowest possible temperature will be of interest. The ice to be most economically used requires to be crushed before being mixed with the salt.

The Proper Breeding Age.

On the subject of age for breeding as regards both young bulls and heifers, Mr. G. C. Humphrey, of the Wisconsin (U.S.A.) experiment station, says the results of experience on the farm prove that if selected for immediate service the bull is all the better if he is three years old or over. A calf should be grown until he is two years old before he is given any service. Between the age of two and three he should not be put to more than 20 or 30 cows. Bulls properly grown, not put to service too young, and treated kindly, yet in a safe manner, are most valuable between the age of three years and the time they become unserviceable, which may not be before they are 15 to 18 years of age. Neither should the heifers be forced into service too young. A heifer needs time to grow and build a body and constitution which will be equal to heavy work and endurance until she is 12 or 15 years of age. Many farm cows are small, delicate and short lived owing to motherhood being forced upon them too young. Two years of age is young enough to produce her first calf. The age of 30 months may be considered better.

Simple and Practical Rat Trap.

The "Revue Agricole," of New Caledonia, gives the following description of an effective rat trap, as published in the "France Australe." The writer says :—"Having broken a large piece out of the neck of a large jar, I condemned it. But one of my children got hold of it and buried it upright in the ground, near the barn, just up to the bottom of the crack, leaving only what remained of the neck above ground. Then he dropped into it a few grains of maize, and covered it with a flat stone. What was my surprise, a few days later, when removing the stone, to find nine large rats and four mice in the bottom of the jar. This was a revelation, so, having killed the rodents, I renewed the supply of grain, put a board over the mouth and weighted it with the stone. Next day I found in it five rats and two mice. I have continued baiting this trap, and every day I capture one or several rodents. Such a trap gives excellent results, and, as it costs absolutely nothing it is within the means of everybody.—Exchange.

Ensilage.

Discussing the exhibits from the Agricultural College, Gatton, at the exhibition of the National Association, August, 1902, the Queensland Agricultural Journal writes:

One of the most important exhibits, perhaps, from a producer's standpoint, was the display of "stack silage" and the samples of ensilage taken from three different types of overground silos and one from a pit, representative of 376 tons of conserved fodder made during March, April, and May this year. Every newspaper which devotes itself to shaping the destinies of "the man on the land" is always emphatic on the value of silage; and if there is one thing more than another to form a fitting subject on which to preach a gospel to the dairyman, it is this. Here it is called "The Dairyman's Salvation." Sceptics are yet to be found, and many still have the idea that ensilage-making is a risky business; but it is about time, considering that the art of storing fodder in this way seems to have been understood over 2,300 years ago, that the sceptics should be confounded. In Xenophon's "Anabasis" (400 B.C.), we are told that in "The Retreat of the Ten Thousand" over Kurdistan and the highlands of Armenia, the Greeks discovered stores of grains and fodders buried in pits, so that the antiquity of the practice is undoubted. Why is it that so many are still content to let the other fellow go in for the so-called luxuries in the way of silos, and be satisfied that the grass is good enough for his cows, and when they go off their milk, turn them out—they don't pay to milk? Others grow green crops, and many let the cows do the cutting: a good plan, forsooth, when labour is so dear! Talk silos to them. "Too expensive," 'tis said; but what of the stack. Farmers, make up your minds—those of you who have not silos, of course—have a try at a stack, and the very act of trying soon results in another convert. Perhaps a good many have tried stacking; but how? It's all very well to quote the old saw, Labor vincit omnia; but mix up a bit of common-sense with it, and success is assured. Given the fodder crop in a suitable stage of growth, the matter of attention to a few details is all that is needed. One must take into consideration, when stacking a mass of fodder in a green state, that the chemical and biological changes occasioned by the processes of fermentation are going to be more uniform when an atmospheric pressure of 15 lb. to the square inch, and incidentally the process of combustion, is guarded against as far as is possible. How is it to be done in the open air? Plenty of dead-weight pressure; shovel up a bit of mother earth. Plenty of people will tell you that they have made good silage in a stack without any pressure at all. Quite correct, but they would have had less waste if they had "weighted" their stack. Adhere to the rule: The coarser the fodder, the greater the amount of dead-weight pressure required. Not by means of any mechanical contrivance. Oh, no! The modern method of a series of wire ropes placed over a stack, a pair of ratchet drums with an engaging paul, and a lever to operate them to tighten the ropes is not necessary. Don't go to this expense.

Here's the scheme:—Save cartage by building your stack right alongside the growing crop. Save bursting yourself by having to lift huge armfuls of fodder on to a dray or wagon, and then again on to the stack. It wants a man with a heart the size of a bullock's to tackle it in this way. Make a few rough bush sledges; load the fodder on to them, on top of a series of short rope slings. Haul to the stack, and hoist the bundles (as soon as it becomes too high to build conveniently from the ground) by means of an ordinary whip hoist. Maize planted a little thickly in drills is one of the best things to grow. You want to cut when the stalks are soft and succulent, and the grain in the "milk" stage. Keep the stalks as nearly as possible parallel in the bundles. When sown in drills, it is easier to cut the crop. There are many methods of harvesting. A sledge fitted up as a "cutter" with a short length of stout scythe blade projecting about 10 in., and set back at an angle, will slice off the stalks rapidly as the sledge is drawn between the rows. Fix a guide rod so that the crop may be laid down evenly, and it can then be gathered readily into bundles.

HOW TO STACK.

Select a dry spot of ground and build a long and fairly narrow stack. Construct a framework of bush poles 13 ft. high, planted firmly in the ground 4 ft. apart along the sides. Fix top plates at the top of the uprights, and twitch them on with wire, and brace across similarly at ends and in the centre. One short length of top-plate should be made movable so that it can be kept low down at first to allow for the travel of the "whip," and gradually moved upwards as stacking is proceeded with. Before commencing to stack, place a layer of about 6 in. of waste grass on the ground. The capacity of stacks may be estimated by allowing about 50 to 56 cubic feet to the ton when consolidated.

Start stacking on the grass, and, here's the gist of it: Keep all the stalks laid the one way. Trans-

verse layers admit air far too much into the mass. Place the tassel end of the maize at least 3 ft. 6in. over at both ends of the stack. When a height of about 5 ft. has been reached, lay down a board flush with the outside pairs of uprights and trim off the projecting ends. Repeat the process. Keep a good camber in the centre of your stack, as heating soon causes abnormal settling there. Use judgment when binding the layers back so as not to have any bumpy joints where the laps come, and be sure that care is taken along the sides to place fairly straight stalks down against each pair of poles, and here the laps must be very carefully watched. Trimming the ends ensures a consolidated section exposed to atmospheric influences, but the carefully concealed overlapping of the stalks at the sides keeps the air from penetrating, and the more the air is kept out, the lower the percentage of loss. Settling takes place rapidly as soon as the mass begins to heat. It is a good plan to throw wires over the stack at night time, and weight them temporarily until the next or following morning with logs. Remove and continue stacking. Be sure to have a wire close to each end where trimmed off. Do not worry about temperatures; expel the air, and these are reduced. More material does this of itself as stacking proceeds. Allow a big margin for settling. When finished to a full camber, spread on top some green grass or other close-textured weeds or waste; water this well, and cart and spread a layer of soil on top, averaging from 12 to 18 in. in thickness. Round it off neatly in the centre to turn the rain. If one is fond of having things look nice, top off with grass built with a full eave. Pass wires across and weight to hold the grass in position. Unship the framework as soon as the stack has settled down. Farmers, you will then have a store of succulent fodder costing only the labour involved in putting it together, and the percentage of loss should not be more than 8 or 10 per cent. The sample on exhibition had been ten weeks in the stack. When about to use silage from a stack, a depth of several inches will be found to have moulded at the ends through contact with the atmosphere. Trim this off, and then cut down a narrow "bench" from top to bottom. The covering of soil on top keeps the rest safe from the weather. Better results are obtained by chaffing the silage before use. A handy method to provide for feeding-out is to make receptacles out of ordinary 4-bushel sacks strung on No. 8 wires. Pairs of uprights, securely braced, are put in for the purpose, and the wires strained. Intermediate supports are also required to prevent sagging, and spreaders should be put in to act as braces for each individual pair.

— Samples and Silos. —

The samples of conserved fodder were taken from several sources—one from a pit, 27 ft. deep, cut out of sandstone formation. This pit is situated in one corner of a hayshed, and, when full, can be covered over with hay; and in this way additional storage space is obtained under one roof. A pit in a well-drained situation, where there is no seepage, is quite effective; if the sides are rough, air is admitted and a slight waste is unavoidable. The pit has been filled with lucerne containing some foreign growths which would have rendered it unfit for making good hay, and with chaffed sorghum and maize, the latter, being a good crop, was frosted slightly, but, when chaffed, resulted in good silage. Another sample is from a "Cherry" type of circular silo erected as an experiment to test the efficacy of a galvanised-iron lining attached to a timber framework, the iron having a protection of a non-corrosive substance. It can be emphatically stated that unless the iron is lined again on the inside with a Portland cement compo. 1in. in thickness, and reinforced with 1-in. mesh wire netting, as found necessary in this and on other occasions where readily corroded linings are adopted, it is an unprofitable class of silo to build, as its life is not only short, but the timbers, as placed, are readily attacked by white ants. Another sample is taken from what was originally a timber-framed octagonal silo lined with fibro-cement lining, but which now has an inner lining of 4 in. of concrete. This silo was built specially to test the sheets of fibro cement as a lining, but they proved too thin and were unable to withstand the pressure and heat of the ensilage. The material if thick enough, is a good non-conductor of heat, but now that timber is so dear a costly wooden structure is unavoidable, and it is more satisfactory to adopt a rein forced silo in preference to any other type.

The "Tandawanna" Sheep Dip.

Mr. W. G. Brown, Sheep and Wool Expert to the Queensland Government in discussing the question of compulsory sheep dipping summarizes the advantages of dipping as follows :—

1. A better and more valuable fleece.

2. A more contented and, therefore, better "doing" sheep.

3. A better and more robust lamb.

4. A fairly large degree of immunity from the attack of the maggot-fly.

The disadvantages of dipping are—

Initial cost of dip and expense of working it.

Liability of injury to sheep, caused by rough usage, which is nearly unavoidable in ill-constructed dips.

The liability to serious loss after dipping by sudden falls in temperature or other changes of weather.

The liability of the animals swallowing a large quantity of the liquid which if it do not kill, will certainly make very sick sheep.

The direct benefits of an increased price for a heavier fleece more than balance the cost of the operation. A sheep may be dipped for three-farthings or less, and at least one penny per pound will be added to the value of its fleece.

As to liability to injury, I shall show below that a new method of dipping has been invented which eliminates all the sources of rough usage, and, further, makes it impossible for a sheep to be poisoned or drowned.

Care in choosing suitable weather will prevent the losses caused by sudden changes of temperature. A sheep should be dipped as early as possible in the day, so that it may shake its wool dry before night.

I met Mr. George Watson, of Tandawanna, some weeks ago, and he told me that for three years he had tried a new and superior method of dipping his sheep. He invited me to inspect his operations, and, a little later, telegraphed me that he was about to dip 42,000 sheep and invited me to Tandawanna. What I saw I shall describe for the benefit of all sheep-men. I believe the method to be the best and most satisfactory in all respects of any.

He informed me thaat he got the original idea from Mr. Charles Keane, of Gurley, New South Wales, but that he has improved on it in many respects since he first used it three years ago. I give below all particulars.

The idea may be described as a shower bath instead of a plunge, and the essentials are a flat tray roof perforated with holes under which sheep stand quietly while the liquid used is showered upon them. The complete specifications of Mr. Watson's dip are as follow :—

The shed is 40 feet long by 12 feet 6 inches wide. The roof is flat and covered with No. 22 gauge, flat galvanised iron, soldered at all seams, and perforated with No. 10 holes 3 inches apart. The iron is turned up all around the edge about 6 inches. Thus the roof is really a big iron tray.

Roof joists are 6 inches by 2 inches, and placed 18 inches apart, and run across the building. The height of the shower is about 6 feet above the floor. The floor is of corrugated galvanised iron, No. 22 gauge, and not battened. The sheep have not injured it in any way in three years' working. The floor is laid with a fall to the side of 2 inches in 10 feet across the shed. The channels of the corrugation lead into a gutter, which carries the liquor draining

off the sheep back into the dip tank where the dip liquor is mixed. The dip tank is an excavation 8 feet by 4 feet by 4 feet, lined with flat galvanised iron and made watertight. From this tank a 3-inch centrifugal pump, worked from a 3½ b.h.p. oil engine, delivers the dip mixture on to the tray roof of the shed, and this falls in a gentle penetrating shower on the sheep standing beneath. A pair of gates at each end of the shed hold the sheep.

In practice, when the entrance gates are opened, the sheep march straight through to the far end of the shed without the least trouble. Such a thing as "dip-shyness" is not seen, and they are thoroughly wetted all over in six or seven minutes. I inspected a number of animals, and found that the dip was all over the body in every case. Three or four minutes suffice to drain them; thus a shedful of sheep may be dipped every fifteen minutes, allowing for filling and emptying. The capacity of the Tandawanna shed is from 250 to 300 sheep. One thousand sheep per hour can be dipped without undue haste by four men.

A excellent feature of the shower dip is its extreme simplicity and small cost of construction. It may be built to work flocks of hundreds of thousands, or small flocks of 1,000 or under. For the small holding a shed which will wet forty or fifty sheep at a time should not cost more than £10, and a cheap 2-inch Douglas hand pump would be quite effective. Better still, a No. 8 semi-rotary pump could be used, and should give excellent results. This pattern of dip is as good for the small holder as the great.

— Drainings. —

Mr. Watson advises that the sheep be packed in pretty tightly. They cannot then hump their backs, and so prevent the dip getting under them as soon as it ought. After the sheep have drained four or five minutes the surface of the dip tank should be skimmed with a hand skimmer. This will keep the solution fairly clean. A minor source of trouble is the presence of short fribs of wool, which find their way into the dip tank, and from there into the shower. The fribs get into the perforations, but are easily removed by a boy using a broom over the surface of the tray.

I have gone into this matter at some length, as I consider that there is no other way to dip sheep that approaches the Tandawanna shower dip. Mr. Watson should receive the thanks of every sheepmaster in the Commonwealth for elaborating a simple, cheap, safe, and effective method of dipping sheep. He informs me that the cost works out for dipping at about ½d. per head.

I shall be pleased to answer any questions on the subject, and give any details which I may have missed above.—Queensland Agricultural Journal.

Pork Rearing.

The Victorian Government Pig Expert, Mr. W. Smith, in the course of a paper on the above subject at a Farmers' Convention, said :—

"In order to obtain food for the pigs, pumpkins, turnips, carrots, melons, sugar beet, grain (not forgetting peas) are the best to grow. The growing of peas not only cleans the land, but takes little out of it. Take a sow at ten months old. In two years she will produce on the average five litters of, say, eight pigs a litter. Keep them on your farm, fatten them, and when fit send them to market, and there is a gross £40 or more a year. If you retain the young pigs until they become baconers, the result will be equally good, for, taking the ordinary rate of improvement, the pig goes on increasing in weight until he reaches 120 lbs. or 160 lbs., at which weight he is best in demand by Victorian bacon curers.

"Let me warn you against feeding pigs on clover and some of the grasses. Suppose you have a dozen pigs, half or three parts fact, which have been running out in the clover. Then put them in the sty, top them up with the very best food, be it grey peas or any other equally good, and what will be the result? They will turn out fishy. The proper thing to do in such a case is to let the pigs go back to poor stores, then top up, and the new meat thus made will be all right. You cannot hoodwink the bacon cured. If he finds you have put in a few fishy ones, you will know all about it by the returns you get.

"Don't give the pig skim milk fresh from the separator. It is aerated, and acts deleteriously, to young pigs especially. Let it remain until next day. Don't keep pigs in confined places up to their bellies in mud. They are not dirty in their habits except you make them so. Don't feed your pigs solely on maize, as pigs so fed do not command the prices that peas-fed pigs do. The bacon from maize-fed pigs turns rusty, and the curer cannot stack it. Don't send discolored grain away. It will pay better to give it to the pig, and let him do the carting. Don't waste pea straw, shavings, or any other straw stuff will do for bedding. It will give comfort to the pigs, and ultimately make good manure for the farm. Don't breed bad stock. Don't forget to feed the pigs regularly."

Line-Breeding as Applied to Sheep.

By C. Mallinson, Principal Sheep and Wool Expert, Union of South Africa Department of Agriculture.

It is well that we should at the outset carefully define what we mean by the term "line-breeding" as opposed to "in-breeding"; the former is breeding from the same blood or within the same family, by selection (but not from such close affinities as parent and offspring and brother and sister), whilst the latter is the ill-considered mating of the closest relations within the one family. Even these definitions are not quite satisfactory, for the point where line-breeding ceases and in-breeding begins is difficult to determine; in fact, the way in which that point can be determined is uncertain, the only factor available in such an inquiry being the result obtained.

— Line Breeding. —

Notwithstanding this difficulty, it is beginning to be recognized that the grading up of flocks can be successfully accomplished only by line breeding, and the large number of breeders who have refused to adopt this method have, in general, overestimated the dangers of such a system and failed to grasp the immense benefit to be derived from its adoption. Rams are constantly being introduced into the flock in the belief that the introduction of new blood will add to its strength and vigour; yet there is evidence that in Australia some of the most valuable flocks belong to men who have never been prominent as buyers of rams. One might go further and say that there are flocks in Australia— and flocks of the highest class—which have received no introduction of new blood for the last sixty years. Even among the more modern flocks violent out-crosses are avoided by those sheepmen whose studs have passed through the initial stages and reached any degree of uniformity.

— In-Breeding. —

In-breeding in itself should not, it may be argued, affect the constitutions of the animals if it be not carried too far, and there should be no reason why one fault should be given prominence over another. But the difficulty is to determine how far in-breeding may be carried on without going too far. What in-breeding actually does is to enlarge all the characteristics of the animals bred and to give prominence to the merits and faults of the particular family used, whether those merits or faults are those of constitution or anything else, but its results are so uncertain that this system is to be avoided; for selection is impossible owing to the small number of units in the family available for selection, that is to say, circumstances prevent the culling of individuals with undesirable qualities stamped upon them, and thus such breeding cannot do anything but deteriorate the flock.

— A Contrast. —

Line-breeding, on the other hand, is so remote and complex, owing to the great number of units in a flock, that selection can be made so as to counteract the growth of particular faults and to encourage desirable qualities. Independently of the selection difficulty, however, it may be stated that breeding between two descendants of a near common ancestor is intensified in-breeding; it is in-breeding carried to its furthest limit; whereas in-breeding between descendants of a remote common ancestor is modified in-breeding, or, as it is called to-day, line-breeding. It is remote and therefore the characteristic effects of the system are less prominent.

— Selection. —

Selection is the essential, for it is by this means that that advantage is to be reaped. No first-class flock ever existed that was not of a type, and the type cannot be fixed by any other method than selection. Yet mere selection in a flock into which fresh blood from strange families is introduced from year to year cannot be expected to fix any type. Of course it must be borne in mind that while external faults are visible to the eye, and may thus be directly guarded against by selection, there are other characteristics, such as a weakly constitution or a tendency to unthriftness, which are not so obvious, though these, too, will be eradicated by judicious annual classing.

— New Blood. —

It is not my intention in any way to disparage the usefulness of an introduction of new blood in certain cases; there are cases in which such an introduction might be necessary to correct undersirable characteristics or failings, or to give prominence to some desirable quality, but—and this is an important thing to remember—the improvement must be made by using a ram of the same breed and the same family as the flock it is desired to improve. At the same time the proper method for the established breeder is to reject fearlessly all undesirable sheep. In the same way as drastic treatment is necessary when pruning a tree, so thorough classing is good for the flock. Let no unworthy animal be spared. The mere moral effect of having a few poor animals in the flock is bad, for it constantly lowers the standard of the breeder's excellence. Weed out the flock then every year, on this account, but even more because a bad tree will inevitably yield evil fruit. Above all things the farmer should learn to shun the delicate,

unthrifty, and weak in constitution. No animal, however fine in appearance, if of feeble constitution can' be expected to breed well, least of all can prepotency be looked for in a sheep of delicate health.

— A Time of Progress. —

The theory that "the methods my father and grandfather followed are good enough for me" is one of the worst ever formulated. It generally indicates that the inherited method is a foolish and careless one. Traditions of this sort are usually kept by those whose fences are rotten, whose weeds are uncut, whose sheep are half-starved and diseased. If it were otherwise the son and grandson would have been educated by it up to a progressive spirit, for he who is first is by his very priority of effort inspired to maintain his pre-eminence. What is necessary for us all is to learn what the scientist has to teach and then to 'apply it in a practical commonsense way, and therefore the sooner all the sheep-farmers in this country study scientific methods of breeding and apply them to their flocks the sooner will South Africa occupy her proper place amongst the pastoral countries of the world.

An Agricultural Student.

We are indebted to the Practical Druggist, writes the Hawkesbury College Journal, for the following interesting, although somewhat alarming, analysis of a student. It may be regarded as approximately the proximate analysis of a young man scaling 150 pounds avoirdupois, and with all his parts complete. Such a young man carries about with him the constituents of 1,200 eggs (presumably average hen, not ostrich or emu). He has enough gas in him (we regret to have to write it) to fill a gasometer of 3,649 cubic feet capacity. The iron within him would suffice to make four ten-penny nails (enough it appears for even an iron constitution). He has fat enough for the manufacture of 75 candles, and a good-sized cake of soap. He has stowed away sufficient phosphates to make 8.064 boxes of matches. The hydrogen he holds, if liberated, would fill a balloon and lift him above the clouds. From his other constituents could be made six teaspoonfuls of salt, a bowl of sugar, and ten gallons of water could be squeezed out of him. This same young man (which means if you weigh 150 pounds) possesses 500 muscles, 1,000,000,000 cells (count them), 200 different bones, four gallons of blood, several hundred feet of intestines, and millions of pores. His heart weighs from 8 to 12 ozs., with a capacity of from 4 to 6 ozs. in each ventricle, and its size is 5 by 3½ by 2½ in. It is a hollow muscular organ, and pumps 22½ lbs. of blood every minute. It beats about 72 times a minute. In a year an average man's heart lifts 11,680,000 lbs. or 8,840 short tons

Farm-Fed Pork.

To fetch payable prices pigs should be well fed, and if allowed to roam at large, they should be run on lucerne paddocks. Lucerne is the king of fodders to graze upon, and it has a nutritive ratio of 1.2-3, that is, there is 1 lb. of digestible proteid of nitrogenous compounds to every 2-3 lb. of carbohydrates (sugars and starches). Rape is also a good crop over which pigs should be allowed to graze, but it has not the same value as lucerne, since its nutritive ration is 1.5-7, and is somewhat too wide.

To fatten pigs in a proper fashion, and secure firmness of flesh and fat, a narrow ratio should be aimed at. If carbohydrates prevail largely in the ration, the flesh and fat are soft, and pigs so fed do not make prime bacon. The chief concern in feeding pigs is to keep the animals upon a narrow ration, that is, narrow as regards the quantity of proteid to the other constituents. It will be found in actual practice that if a highly nitrogenous ration is given, the other constituents (sugar, starches and fats) will be found present in large enough quantities to meet all the requirements of the animal.

Peameal, or oatmeal or beanmeal should prevail in the rations of every young pig, and the food should be given in skim milk or butter milk, warmed to 100 deg. Fahr. With older animals a diet in which any one or more of the following foods, which are all rich in nitrogen, and in which the nutritive ratio is as narrow as is required should prevail—peas, whole or crushed; beans, whole or crushed; pollard, oats, brewers' grains cocoanut meal, sunflower seed and rape seed meal, given in skim milk or butter milk—should be regularly fed. Cotton seed meal or linseed meal might be occasionally given with advantage. They are laxative in action as well as being rich in proteids.

Pigs also require plenty of wood ashes and ground green bone, or bone meal, in their rations. The rations should be plentifully supplied, quite up to the limits of capacity, since it is required to produce small carcases as quickly as possible, and then when the pigs attain a certain weight they should be instantly disposed of. Quickness in getting the porkers ready for market should be the aim, and conducting operations on these principles will give large profits. Somewhere about 400 lbs. of any of the foods above mentioned will put 100 lbs. live weight on a pig.

Some little time before slaughter pigs should be penned up and topped off. A highly nitrogenous diet is absolutely essential in imparting firmness to the fat and flesh. It is quite easy to determine carcases that have been fed largely on carbohydrates. From the outset of existence pigs should be well fed. If they should happen to get a set-back just as they are starting life it takes a long time to overtake and repair the damage. Whole milk is the best food for very young pigs. In the absence of whole milk, skim milk and linseed meal or oatmeal make a good diet.

A Case of Garget.

A correspondent writes as follows to the "Canadian Dairyman":—"Will you be good enough to give me a little advice? One of my best cows dropped her fourth calf last Febuary in good order, and apparently O.K. About a month later her udder began to cake. I did all I could in the way of hand rubbing, but it gradually got worse. I am now drying her, as she is due to come in again in Febuary. There is still some caking. How can I prevent the trouble? The cow is in fairly good condition, and feeds well at all times. She is a very heavy milker, and carries a large udder. Last season I was feeding her some meal to keep her in good shape before she came in, with the intention of having her tested. You will be helping me greatly by giving me your advice on this matter." to which the Editor replies :—

A cow's udder is rather a complicated piece of machinery. It is

hard enough to tell when anything goes wrong with it when you have the cow before you, let alone advising the man what to do when the cow is 400 miles away. However, a few general statements will undoubtedly help this enquirer and others. This evidently a case of garget; as it is very seldom a cow's udder cakes a month after calving. The proper treatment would have been to give the cow 1½ lbs. of salts at once, whether it was garget or something else. If taken in time, this would likely scatter the trouble, but if delayed a day or two it ought to be followed by another dose of 1½ lbs. Epsom salts. This is better than any local treatment for garget, and for some other troubles of the udder.

It is well to understand the reason for this. When the cow's blood is out of order, the trouble shows up in her udder right away. It is necessary to give salts, therefore, to correct her blood. After giving the cow Epsom salts it would be well to follow with saltpetre, giving a small teaspoonful.

The point desired is to keep her bowels moving freely on light feed. Physic the cow well before calving, so that she will not require it afterwards, as she is then weak enough. If the udder is hot or in bad shape, however, it would be better to give the cow salts after calving than to run any risk of losing her udder or any part of it. About the best udder cure is hot water, hot as the hand can bear it, and applied to the udder with a sponge or woolen rag and soap for 15 minutes at least. This will draw out inflammation better than anything. After thoroughly fomenting the udder with hot water rub gently about a cup of whisky to the udder to remove any danger of catching cold. This treatment can never do the cow any harm, and it is always well to go to some trouble to save a good cow, besides relieving her of pain.

Action of Lime on the Soil.

By J. Lewis, M.A., Analyst.

If lime be added to a stiff clay the impervious clay is modified to a mass consisting of comparatively large, though in themselves still small, particles. The circulation of air through the soil is thereby facilitated, a freer passage afforded to plant roots, and the percolation of rain promoted, with a consequent diminution of the evil of scouring or rainwash. The tendency of stiff clay to harden after rain is due to the extreme fineness of the particles. If such a clay is stirred up with water the muddy liquid so formed remains turbid for a long time, but if a little lime is added the tiny patches of clay coalesce into flakes, which settle rapidly. If two funnels are packed one with clay, the other with clay mixed with from a quarter to one per cent. of lime, and pure water poured on the top of the layers, it will be observed that, while the water percolates through the untreated clay in a period of time measurable in days, the limed clay allows of the passage of the water in a few hours. If the treated and untreated clay be moulded into balls and dried, the former will become a hard unyielding mass; the latter will crumble to slight pressure. Precisely this occurs in a limed clay soil: the clay is flocculated, the percolation of water promoted, and caking prevented. Caustic lime is more efficient in modifying clay soils than gypsum or carbonate of lime.

The decay of vegetable matter in soils poor in lime results in acid or sour soil. Liming with carbonate or caustic lime is a remedy, the lime supplied in either form neutralising the acids produced in the decomposition of the organic matter. The presence of lime also increases the rate of decay, and hence renders the valuable food elements more rapidly available for re-absorption by growing plants. It is a common observation that leaves remain long on the surface of soils deficient in lime, such as the granitic and sandy soils, and disappear rapidly in limestone districts.

If soils poor in lime are fertilised with superphosphate, a portion of the valuable soluble phosphoric acid of the fertiliser combines with the iron and alumina in the soil, forming insoluble combinations which are only slowly and with difficulty absorbed by plants. The presence of lime retards this reversion, as it is called, and may prevent it altogether, or even reconvert the insoluble phosphate to a soluble form, thus placing a greater proportion of food at the disposal of the plant.

The minerals in the soil, many of which contain potash are gradually being broken down by a chemical action in such a manner that soluble compounds are slowly formed which afford nourishment to plants. Lime has a remarkable effect in facilitating this decomposition of minerals; in particular does it increase the amount of available potash in the soil. Since lime hastens the decay of the organic matter in the soil, and renders the potash and phosphoric acid more rapidly available to the plant, it will be readily understood that a soil rich in lime, or to which lime is added will be exhausted far sooner than one poor in lime, but containing the same percentage of potential plant food. In other words, the larger crops that can be grown in the presence of lime exhaust the land more quickly than poor crops. This explains the old adage—"Lime and lime without manure will make both land and farmer poor"—and suggests the remedy. The heavier crops raised carry off the plant food in the soil, and its place must be supplied by the increased use of farmyard manure and artificial fertilisers.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

The Practical Value of a Soil Analysis.

Inquiries, writes the Journal of the British Board of Agriculture, are frequently received from farmers and gardeners who wish to be informed where they can have soils analysed. In most cases the idea appears to be entertained that having a soil analysed is a ready means of determining its manurial requirements, or of obtaining an indication of its fertility. A brief discussion as to how far this view is correct may therefore not be out of place. Take, first, the broad question — to what extent does an analysis of a soil give an indication of that soil's fertility?

The fertility of a soil may be defined as its power of growing crops, and it is obvious that while this depends to a great extent on the soil's ability to supply the crop with what is olten termed plant food—in particular, nitrogen, phosphate, and potash—in a suitable form, this is by no means the only essential condition. A sufficient and continuous supply of water to the roots, and proper aeration of the soil, are quite as necessary for satisfactory growth as the supply of manurial ingredients. To a very great extent these factors are regulated by circumstances of climate, exposure, drainage, and depth of soil, which obviously cannot be determined in the laboratory. Even if the analyst could give complete information about the plant food, and were able to measure accurately the mechanical condition (i.e., texture) of the soil, and to correlate it exactly with the questions of aeration, drainage, and water supply, the information obtained in the laboratory could only give a very incomplete idea as to the fertility of any particular field, and the farmer would have to supplement it by his local knowledge, experience, and judgment.

— Limitations. —

Unfortunately, however, the analyst cannot at present give more than very rough and incomplete information even about those factors influencing fertility which lie within his province. Some of the difficulties with which he has to contend may be mentioned here. He can determine as accurately as need be the total amounts of nitrogen, phosphates, and potash in the soil, but it has been found that, even where external factors such as climate, depth of soil, etc., do not enter into the case, there is often little or no connection between these amounts and the soil's fertility or its manurial requirements. Any ordinary soil contains much more total plant food of all forms than a single crop of any kind can possibly require. Most of this plant food, however, is in an unavailable or locked-up condition, and is only gradually set free or made available, the rate varying in different cases. As the plant can only make use of the free or available food, it is easy to see that it is quite possible for one soil, containing quite small amounts of the manurial substances, to produce better crops than another soil containing large quantities, if for any reason the first soil gives up its material to the plant at a more rapid rate than the second. In fact, many soils contain very large quantities of, say, phosphates, and still respond most readily to small dressings of manures containing available phosphate, because practically all that is already in the soil is unavailable, and, as far as the plant is concerned, might almost as well not be there at all. (It may be remarked that exposure to air and weather, and treatment which secures a healthy condition of soil, are some of the factors which determine tha rate at which plant food becomes available in the soil, so that, apart from their other important functions, good cultivation, draining, and liming may partly take the place of manuring in a soil which contains large stores of locked-up food.)

In the case of phosphates and potash, a method has been devised of roughly measuring the amount which may be regarded as of immediate or prospective value to the plant, by finding, not the total amount of phosphate or potash present, but the amount which is dissolved out in a given time by a weak solution of citric acid. This method gives results which in many cases indicate fairly well whether a particular soil will respond to applications of either of the two kinds of manure, and may be used in comparing soils of the same class. At the same time there are many cases where the results obtained are at variance with those obtained by actual experiment in the field. So far, no ready method has been discovered by which the availability of the nitrogen in the soil can be estimated except as regards the small amount present in the form of nitrates or of ammonium salts.

As already mentioned, two conditions essential for the satisfac-

tory growth of crops are a sufficient supply of water and the proper aeration of the soil. To a great extent the ability of the soil to meet the plant's requirements in these respects is determined by the size and nature of the particles of which the soil is composed. By carrying out a "mechanical analysis," the proportions of particles of different degrees of coarseness can be measured, and as the results of such analyses accumulate, it will probably become possible to estimate from such an analysis such factors as water-retaining power, ease of drainage, ability to withstand prolonged drought, and so forth, and even to say with some degree of certainty what systems of cultivation are most likely to result in a good tilth at any particular time of year. At present, however, such an analysis is tedious and expensive, and in most cases an experienced farmer would be able to gain more useful and accurate information by walking over the land and examining it carefully at different times of the year.

On the whole, in the present state of our knowledge, it must be concluded (1) that chemical and mechanical analyses of soils are of little practical value except in a few special cases; (2) that an intelligent and experienced local farmer could give a much better idea of the fertility of any particular farm or field than an analyst; and (3) that as a means of determining the manurial requirements of a soil a simple field experiment gives more accurate and reliable knowledge than ordinary analyses.

In certain special cases, however, soil analyses may undoubtedly be of great practical value, e.g., (1) by a very simple test, which most farmers could carry out for themselves, it is possible to say whether a soil is in need of liming or not; (2) if, by means of a Soil Survey, such as those now being carried out in many parts of this, and other countries, complete information has been obtained with regard to some special class of soil occurring in a limited area, different samples of that particular soil can be compared and classified accurately, and their manurial and cultural requirements predicted with a considerable degree of certainty.

"If I should die you would never get another wife who would look after you as I have done." "No; not if I know it."

Olympia Show.

An Australian who was present at the last International Horse Show held at Olympia, in London, writes to Elder's Review of that function, with its cavalcade of immensely valuable horse flesh, as being one of the most interesting and refreshing sights that he had ever seen.

America was not on this latest occasion represented officially in the gathering of army horsemen here competing for the honour of the countries which they represented, but America was present in the constant series of harnessed classes, and the equine performers of that great sportsman, Judge Moore, proved as great an attraction to British horse-lovers as has been the case on other occasions. One of the real novelties on the last occasion was a parade of horses of all nationalities and breeds. Pride of place fell to the Clydesdales, and in succession to them came Shires, Suffolks, Jutlands, and Percherons. The Jutlands are a heavy type from Denmark, and bear a strong family likeness to the Suffolk, being chestnut in colour, with here and there a long flaxen mane. About the middle of the last century the Suffolk was imported to Denmark and introduced into the local breed. It seems that there are about 300,000 horses of this great breed in Jutland, and that the aim of the breeders has been to establish a well-shaped, good-looking horse of medium size adapted to heavy work at a trot. A number of very fine Percherons were exhibited. The present King of England sent two creams and two blacks, which were followed by the Cleveland bays and Yorkshire coach horses. The creams caused quite a sensation, as nobody was prepared to see horses of such size, strength, build, and beautiful carriage. They were distinctly coachy in appearance, having eyes of a curious grey-blue tint, and nostrils and mouth of a pinky-tinge colour. The strain is now maintained at Hampton Court, in Surrey—the place which abounds with history of the Henry VIII. period. The particular specimens which were on view here are direct descendants of the creamy animals presented to the late Queen Victoria by her uncle, the King of Hanover, a century ago. The black horses originally came from Flanders, and they also had a very coachy appearance, which was not to be wondered at, seeing that it is for this special reason that they have been consistently bred for generations. The Cleveland bays, which are probably best known in Yorkshire, where they are regarded as ideal types of harness horses, did not arouse much enthusuasm among Australian spectators. The Andalusians from Spain attracted much attention. The stallion was a dark-bay, and it was brought into the ring with a curled mane, and was led by an attendant wearing a gaudy costume. The mare was grey, and had a bell artached to a broad leather collar. Some fine horses came from the Royal stables of Denmark, and were known among the better informed as the Fredericksborg horses. There were also all sorts of foreign horses to be seen, but it was only natural that greater interest should be taken over those which had a British origin, more especially over those which can claim a certain amount of historic antiquity. Among these was a type shown as the British pack-horse. In this type one mets with a good, nice-looking hauler whose function, no doubt, in the smuggling days, along the coast of Yorkshire and Lincolnshire, and other parts of the seaboard, was to bear loads of merchandise up the steep cliffs. It is said that this particular type of animal is very nearly extinct, and that the specimens, which are still alive, in the whole country can be counted on the fingers of both hands. Before the coach was invented the pack-horse was the only means of conveying loads over rough roads, moors, and bridle-paths, and the great utility of the animal caused it to receive much skill in development among breeders. The latter specially laid themselves out to establish a broad back, wide hips, and legs, and great substance, and it seems a great pity that a type of such great utility should be thus bordering upon extinction. Of course, there were scores of Scotch, Welsh, and Irish ponies, and others from the fells and moors of Great Britain. The grouping of each was very fascinating. The mountain and various ponies, which undoubtedly form the basis of some of England's best types, were also there in considerable numbers, and quaint hairy-faced articles some of them were. The lesson to be learnt from the animals' parades which one saw at the last Olympia Show is decidedly a satisfactory one. The breeds of Great Britain proved themselves still worthy to hold their own against the keenest of the world.
of opponents from all other parts

Dynamite in Agriculture.

Though the theory and practice of the use of dynamite in agriculture is not exactly new, more attention has of late been given to the matter in the agricultural press. Readers will remember that we have published a number of articles from various sources, showing that the subject is one worthy of careful consideration and more extended discussion. When land is cheap the matter is not of the same importance to the general farmer as it is to his fellow-worker who has to make interest and profit from land of higher price. In South Australia rising land values indicate that the day is not distant when the margin between cost of production, where the land is only surface scratched—however thoroughly the scratching may be done—and the returns realized will become much narrower than is the case at present. It pays the vine grower of Southern Europe, to hand trench land to be planted to a depth of three or four feet, or to come nearer home, one need only refer to the market gardeners of the Mt. Lofty hills, who practice the same deep cultivation, and who probably raise more produce per acre than any other class of producers in the Commonwealth. The farmer, and more particularly the fruitgrower, should derive proportionate advantage from drawing on larger stores of plant food and moisture. Dynamiting from the point of view of the producer, may be considered as affecting several different operations; as, for instance, an alternative method of clearing land of stumps or boulders, as an agent for sub-soiling pure and simple, for preparing stations for fruit trees, for excavating, for cutting out irrigation channels, and for swamp draining, for it can be said that it is in extensive use for all these purposes in different parts of the world.

The average farmer is apt to look upon dynamite in any form, as a somewhat costly, not so say dangerous, substance to handle. As a matter of fact there is abundant evident to show that it is neither; we do not of course mean to suggest that anybody would be well advised to play handball with a dynamite cartridge in a temperature at 110, but with ordinary precautions it is infinitely safer than aviation or even tram riding. As to cost—in an article we quoted recently subsoiling was estimated at £3 per acre. That was in South Africa with native labor, and would probably be somewhat exceeded here. Unfortunately, from a national point of view, the clearing of land of heavy stumps is not a matter which concerns a vast number of farmers, as is the case in large areas of the United States, where they have come to regard dynamite in one of its many forms as the quickest and easiest ways of clearing land. But it undoubtedly has uses in this connection in S.A.

It is perhaps as a means of cheap preparation of land for fruit trees, that dynamite will find its earliest and possibly its most extended use in this State. Any agent which will at very little expenditure of time and at the cost of a very few pence, thoroughly shatter and disintegrate a soil for an area and depth of several feet, presents possibilities which probably fruitgrowers will not be slow in recognizing. It would appear that to thus assist the young tree in sending its roots laterally, and more particularly downward, and

o immensely adding to the stores of plant food, readily made available, would be a profitable propoition.

The use of dynamite is not of course practicable for all soils and under all conditions. It is a subject, which the individual worker must think out for himself, keeping n mind the broad principles which govern its use and possibilities. We do not know that much has been done even experimentally in Australia, but there is undoubtedly room for much work in this direction.

Lumpy Jaw.

(By L. L. Paterson, Veterinary Surgeon).

Actino-mycosis is that morbid condition of an animal brought about by the presence of a fungus called the ctinomycis—a long name, but to hose familiar with the structure of words it explains to them somewhat he characteristics of the parasite. ctino-mycis a literally ray fungus and so it is, for an examination of he fungus taken from the tissues of n animal will reveal, under a low ower of the microscope, the ray-like rrangement of the parasite, resembling the spokes of a wheel. Nomenclature of this kind is invariably found hroughout the scientific world, and lthough not euphonic invariably esignates some leading characteristic ither in the cause or effect concerning the subject in question.

The above disease is one found frequently in some districts and although cattle are mostly affected, the orse, pig, and man are by no means xempt, and in those whose occupation associates them more or less with hay or straw, the disease is not ncommon, for hay and straw are he chief carriers of the germ. In cattle and horses it assumes different forms. In the former animals the tongue when affected becomes partly swollen and hardened, hence it has been appropriately termed wooden tongue, and when the jaw is the site of the lesion, lumpy jaw is the more common term.

In horses the affection usually locates itself in the jaw, and in that situation generally assumes the character of a chronic abscess, which persistently discharges. In cows actinomycotic tumors are said never to break down into abscesses, but the exceptions to this rule are various. The lesions in man resemble greatly those of the horse, and in the pig the milk glands are the more common sites of the disease. The disease is one which does not spread from one animal to another, being non-contagious, for infection from one animal to another is scarcely possible. The mode of attack is usually through some abrasion in the lining membrane of the mouth, and hence it is that the disease nearly always presents itself affecting some portion of the aral cavity. Nor is this difficult to explain. The infecting microbe, which when magnified about 530 diameters, appears as a minute dot, is to be found in the grass or hay, and when this is ingested, infection taken place through the abrasions in the mouth, and a reactive inflammation results in a large tumour formation. Cattle are unable to chew their food, and horses are rendered unsightly, and as treatment in the later stages it usually fraught with ill-success, the gravity of this affection makes an early recognition of the disease important. In the early stages surgical interference is indicated when it is more frequently possible to deal with the local lesions, and then a thorough cauterization of its parts followed by a complete disinfection by irrigation with solutions of iodine or mercury, will often be followed by success. In the advanced stages the disease becomes generalised, that is those tumor growths become diffused pretty well over the whole body, and this condition is known to veterinary science as pyaemia.

The precautions to be taken where this disease is prevalent are embodied in the old saying, "Ridding the cause and the effects will cease," for as the infecting agent is to be found in the pasturage, the radical treatment should be directed towards the fodder, and hence it is that our grass fires, although attended by temporary loss, in reality act not only as fertilisers, but as scavengers, and rid our pastures of the parasites, both animal and vegatable, which year by year infest our live stock and cause considerable decrease in the annual profits of the farmer.

He: Have you ever met your ideal? She: Pardon me. Is that your father's house over there? Yes; he owns eight others lust like it. She (with a long sigh): Ah! yes; I have met my ideal at last.

About Horses.

Of the 100,000,000 horses known to exist in the world, 80,000,000, or four-fifths of the entire number, are found in the temperate zone, and nearly all among Occidental people. The remaining 20,000,000, scattered through the tropics, are largely employed in the service of temperate zone vis tors or residents. In the United States and Canada there is one horse for every 372 persons; in South America one for every 7; in Mexico, one for every 12; in Japan, one for every 30; one for 40 in Turkey; for 50 in the Philippines; for about 150 in Africa; and 200 in India and Southern China.

Long before the coming of Julius Caesar the inhabitants of England possessed horses of a kind. Those animals were used as beasts of burden and also for drawing our ancestors in their chariots. And with that scant amount of information concerning pre-Roman horseflesh we must be content, for history becomes silent at this point. We have to go on for several hundred years, until A.D. 631, before any more light is thrown on the subject. About that time, says the Venerable Bede, the English began to saddle their horses, and the same author remarks that at that period people of rank first distinguished themselves by appearing on horseback. William the Conquerer imported fresh blood from Normandy and other countries, and the breed of horses was considerably improved thereby. It is to Roger of Belesme, Earl of Shrewsbury, who flourished about this period, that English horse-breeding owes much. That worthy nobleman, at great expense to himself, brought over some Spanish stallions and formed a stud with English mares upon his estate of Powisland. "This race of horses," says the historian, "was calculated for the purposes of war, and for pageantry on grand solemnities."

Athenaeus and Pliny claim to have known the horse to attain the age of sixty-five or even seventy years. Augustus Niphens speaks of a horse belonging to Ferdinand I which was over seventy. Hartman and Buffon both note that the life of mares is generally longer than that of horses. This observation was already made by Aristotle, and corresponds to the same rule in the human race, where women generally live to a greater age than men.

Mons. A. Meynard, of Carbon Blanc, in the Gironde, recorded in the "Revue Renerale de Medicine Veterinaire," of February, 1903, a remarkable case of longevity in a mare. She was known to have been hunted in 1864;)the exact date when she was foaled was not known, but it was believed to have been 1859 or 1860. As she was hunted in 1864 she could hardly have been less than four years old, and in 1903, when she would have thus been about forty-three years ago, she was still in good health. It is worth noticing that she threw a foal in 1895 and again in 1896. Mons G. Chevir, in the same publication, mentioned the case of a gelding which was foaled by a Russian mare in 1814, and died in 1870 at the age of fifty-six years.

Mr. W. C. Blackett, a mining engineer, has record of a Shetland pony ten hands high which spent over twenty years in a coal mine. When five years old he was put to work down Kimblesworth pit on May 2, 1876. He ceased work twenty and a half years later, an October 12, 1898, aged twenty-seven years. During the whole of his working life he never had a sick or sorry day, the six weeks' strike of 1879 and the thirteen weeks' strike of 1892 being the only occasions when he was idle. On August 8, 1896, when twenty-five years old, he took third prize among twenty other pit ponies shown in Durham.

In 1901 a farmer named John Keating, of Tarmons, in the 'County Kerry, had a horse aged thirty years, which was still doing ordinary farm work. Until shortly before he reached thirty years he was regularly employed drawing loads of one ton from Cahirciveen to Watteville, a distance of eleven miles. He stood about 14 hands 2 inches, and was believed to be a cross between a Kerry mountain pony and a hackney.

In South Africa, more than anywhere else, says a colonist who was long engaged in the business, dces a man need practical knowledge and experience in horse-dealing. The Kaffirs provide nine-tenths of the horses sold in the colonies, anh Kaffir ideas of horseflesh are peculiar. There is a constant market open for horses suitable for the mounted pol ce forces and for the ponies required in the military barracks, and the dealer's method is to take up his quarters in native territory, and let it be known that he is prepared to buy animals. He has not long to wait before the native breeders begin to come in with all sorts and descriptions of the equine tribe for his inspection, the majority of which are of no earthly use to him. Mares gone in every leg by being rushed over rough ground, and with sore backs, the very sight of which make any man with a grain of f?eling in him shudder and wish he were sufficiently wealthy to be able to buy the lot for the mere pleasure of putting the poor beasts out of their misery; horses and ponies that could never be built up, the result of too early work and barbarous treatment generally; others with no shoulders or chests to speak of, and with quarters on which, in colonial parlance "you could not balance a pound of butter."

An interesting example of the tenacity of a horse's memory was recorded in the Sporting Magazine a century ago. A Bristol gentleman bought a horse from a Mr. Sadler. Soon after the animal was stolen, and nothing more was heard of it till about three years subsequently, when the horse, saddled and bridled, appeared at Mr. Sadler's stables, and, the door happening to be open, entered and made his way into his old stall. The groom recognized him at once at the horse his master had sold to the Bristol purchaser. It was ascertained that the last owner had bought the horse "in Birmingham 18 months before, and had ridden it to Bristol the preceding night. The animal had broken away from the boy who was leading it to water, and galloped straight to the stable whence it had been sold three years before.

The stamp of horse required for artillery work should be of a "blocky" sort with as much breeding and bone as possible. The cavalry horse should be of a lighter type with good shoulders, necessary for carrying weight, and possessing also strong loins and neck. The type of animal most requisite for the

mounted infantryman is a cobby sort, in fact a miniature horse.

The German Army requires about 10,000 remounts every year. About one-tenth of the cavalry and transport horses and about one-ninth of the artillery horses in the service are "cast" and replaced by new ones each year. As a rule, all the remounts are bought at three or four years old. First they are sent to "remount depots" — large pasture-farms belonging to the Government—where they remain for a year before they are drafted out to regiment and battery. The German Empire is divided for remount purposes into six districts, in each of which there is a Purchase Board consisting of three officers and a veterinary-surgeon; and the civil authorities' duty is to arrange for the holding of fairs, to which owners may bring horses for sale to the Boards.

Horses often develop peculiar idiosyncrasies. Rather an inconvenient one was that evinced by "Sir Kenneth," the property of the late Mr. Bloss, an American racing-man. "Sir Kenneth" could never be induced to take physic, and, though not an absolute savage, always showed fight when any attempt was made to physic him. On one occasion a dose of Epsom salts was considered quite essential to his well-being, and the dose was put into a pail of water in his box. For three days and three nights the horse refused to touch the drink, but at length he gave way to thirst and he took it. What his temper was like afterwards we are not told. Like several other horses, "Sir Kenneth" was greatly attached to a cat which spent most of her time on his back in the stable. She was accidentally destroyed, and the horse became so restless that another cat was procured for him. The new one had no sooner been placed on his back than he showed most violent temper, frightening the cat out of his box once and for all. Some time afterwards a weakly kitten found its way into his box, and "Sir Kenneth" immediately adopted it as the successor of his lost friend.

When Napoleon was preparing for campaign which was closed by the battle of Waterloo he found that the army was extremely short of horses. The artillery and transport had 8,000 horses, but 5,000 of these were let out to farmers as work-horses. These were called in and the mounted police were ordered to send in half the total number of horses they possessed, by which means 4,300 were obtained and distributed among the cavalry regiments. In two months Napoleon collected 41,000 cavalry horses and some 16,000 for artillery and transport, and this despite the strictness of the officer in charge of the principal remount depot, who refused to accept horses over age and horses half an inch under the regulation height.

The American cavalry mount must be a gelding not under 15¼ nor over 16 hands high, and weight not less than 950 nor more than 1,150 pounds. He must possess the attributes of an intelligent horse, with broad forehead large, prominent eyes, and perfect vision. In conformation the barrel needs to be round, the shoulders slanting, back short, and loins well arched to carry weight. The legs need to be well under the body, and the hoof of medium size and sound. Grey, white, and cream-coloured horses are barred from the service. All cavalry horses accepted on Government contracts must be between the ages of five and eight years.

The great naturalist, Buffon, would never believe in the soundness of the objection to four white stockings or feet. He thought that the objection grew out of an optical illusion, the movements of white feet attracting the eye more than those of dark hoofs. Buffon came to the conclusion that the white hoofs seemed to pass closer together than dark hoofs, whence, he reasoned, grew up the idea that horses with white feet were more liable than others to stumble.

On the large South African farms of 6,000 or 7,000 acres, which are devoted to ostriches, the work of bringing in the birds to be plucked of their valuable feathers is done by men on horseback, and a very exciting job it is for the horseman. The horses used for this purpose become wonderfully clever after a time, and learn all the tricks of the bolting or fighting ostrich. Should the horse turn tail and run away the vengeful cock ostrich can easily overtake him, and may kick the rider out of his saddle; also, if the horse be slow in wheeling or in dodging kicks the ostrich may deliver a blow which will break the man's thigh. The horse that understands the ostrich-driving business learns to dodge every kick while his rider reduces the great bird to order by plying his cutting whip about its head and neck, punishment which eventually cows the ostrich into docility and willingness to rejoin the drove.

A veterinary surgeon at Montmirail, in the Department of the Marne, about five years ago had a horse which acquired remarkable skill in unfastening doors. He was kept in a stable under a loft, whence the oats were sent down through a wooden shaft, at the lower end of which, about four feet from the ground, was a little door sliding in grooves. The horse learned to lift up this door, and allow the oats to flow out on the floor. When it was discovered that he did this, the door was fastened by means of a wooden peg driven into the shaft. The horse drew the peg without the least difficulty, and got the oats again. Then he was put in a box in another stable, the lower door being bolted outside, while the upper half had a small door secured by a bolt inside. The next morning both bolts were found unfastened and the horse was loose in the yard. Mons. Guenon, author of a very interesting work called "The Mind of the Horse," went to Montmirail to see this animal, and photographed him in the act of opening the cat shaft-door and unfastening bolts.

Mr. March Phillips, in his interesting book, "In the Desert," thus describes the method of the Arab horse-dealer: "An Arab's notion of showing off his horse is to charge down the street past you as hard as he can lay legs to the ground, uttering short shrieks and brandishing a long rifle over his head. Wherever we went we were pursued by these thundering cavaliers. Down they would charge, their dark features convulsed with excitement, their white robes blown in the wind behind and go whirling down the road in a cloud of dust. It was an appeal to our imagination, designed to fire us with the idea of their steed being something fleet and strong and terrible. Their contempt when we set about the cold-blooded process of prising open mouths and pinching legs was unutterable. What base-born barbarians we must be to entertain a low curiosity about Mazeppa's legs and teeth! As Mazeppa was usually a broken-down cripple or a lanky foal, a cloud of dust often set him off to the best advantage."

An old writer on horses and horsemanship placed on record his belief that "a stumbling or slow horse is partly made by carrying his weight (burden) forwards and a safe and swift horse by carrying his weight backwards, especially in the walk and trot. I do not think so in the gallop." In support of this view he cites the practice of the London butchers' boys, as follows:—"It may be observed that butchers' horses are in general faster trotters than other men's, particularly in London: and their practice is to sit on the loins of the horse, having a sort of pad before them to buckle the tray on containing the meat; thus those horses carry little or no weight on the part where riders usually sit, the greater portion of their load resting on the loins. Again, the boy always rides with spurs, and pricks the horse behind, which I believe to be another advantage. Altogether, the butcher's horse is rendered both speedier and safer than the generality of hackneys."

Churning the clay, or rather mud, for brickmaking in Argentina is done by mares. First a rough circular fence is made from anything convenient, and then within this enclosure black earth is dug up and thrown in to the depth of about a couple of feet, with dry grass, horse dung, and water. To mix these ingredients thoroughly twenty or thirty mares are "driven headlong into the brew and driven round and round, maddened by the yells and whoops of the men, floundering and splashing till the whole mass is trodden down into a slush of liquid mud. Once in the wild rush a mare stumbled and sank, and was trampled under by her struggling comrades; she was lassooed and dragged out, dead from suffocation."

Poultry Notes

The Process of Moulting.

Science has yet much to tell us of the true physiological reason and result of the annual loss and renewal of plumage which we call moulting, but for all practical purposes it is enough to know that the season which will soon be with us is, for the poultry-breeder, one which will largely determine the success or failure of the year's work.

As it is a process common alike to domestic and wild fowl, it is evidently as natural as it is inevitable, and should therefore not be regarded as it is by some as a disease, though it is no doubt a strain on the vigor and vitality of the bird.

In wild fowl the change of plumage is effected in a purely natural manner, under natural conditions, and probably takes a considerable time to complete, but is not marked by any considerable diminution of health or visible outward sign. So with domestic poultry, the nearer we approach natural conditions the more easily will the period be passed, but also, unfortunately, the more unprofitable will it be (unquestionably natural methods persisted in, would eventually lead to reversion to a small fowl, laying 20 or 30 eggs per annum) therefore to the farmer whose birds have reared themselves or with but little assistance from man, and are strong and healthy, by reason of the abundant natural food of spring and the wheat fields the moulting time will be one of little anxiety, but also one of more or less loss.

The penned fowl, however, with a mission in life, whether in connection with the egg basket or show pen will require, and pay for extra care during her moult, for it will be seen that the more easily and quickly this is accomplished the longer will be her season of productiveness, and the earlier will it begin. The great difference which at present exists between the price of eggs in late autumn and mid spring will yearly become less marked owing to increasing facilities for preserving eggs, but there will always be considerable difference, because a preserved egg is, after all, not a "new-laid" egg, and the hen which lays from April to August will be the most profitable then as now.

It was at one time thought that moulting, being a natural process, subject only to individual or breed characteristics, it was not within the power of the poultry-keeper to promote or retard it but later experiments have proved that not only can an early moult be induced, but its progress can be accelerated to a very considerable degree, and this ability to get the flock through rapidly is really the keynote to the problem of winter eggs.

The average period of moult varies according to the age and vigor of the bird. A young healthy bird hatched at the right time, well fed and well cared for, would pass through it very much more quickly than an older bird, or one which was weakly; the former might, if conditions were favorable, be through in six to eight weeks; the latter would probably take any time between three to four months.

The percentage of hens which lay well or even at all during moult is not large; indeed, it is open to question whether it is altogether desirable, even if given special scientifically-compounded food. In American poultry-keeping this balancing of rations is almost an exact science, the true composition and feeding value of each ingredient being carefully considered, and the precise proportion of protein, carbohydrates, etc., best suited for the purpose in hand, whether it be the production of meat, eggs, or feathers.

The great importance of the nature of the food given before and during moult will be seen when we remember that in addition to the ordinary maintenance allowance, it must contain the necessary elements for feather production, and that both these requirements must be satisfied before any surplus can be devoted to egg-making. By the way, this provision of material for egg-making at any season is often overlooked as a distinct and separate necessity, and it is forgotten that eggs are the direct result of food supplied over and above the amount necessary to maintain healthy life. The hen naturally absorbs first sufficient to maintain herself then if the food is suitable she manufactures eggs some of the remaining balance of food goes to fat, and if she still continues to eat to liver disease and waste.

Reversing the process, a fat hen when her allowance is reduced below maintenance rate, makes up the deficiency first by drawing on her fat for nourishment, then she

stops laying, and reabsorbs the eggs she has been preparing, and finally starves.

But to return to moulting and the consideration of the means by which we can attain the desired end, viz., a quick and healthy moult, with its resulting gain in getting the birds quickly back to business. No doubt there are other aids, but the prime factor in doing this is the giving of the right food in proper quantities.

We will suppose that the reader's birds are in good health, but that the eggs supply is falling off, and that either the first signs of a general moult are becoming apparent, or that he wishes to induce it. The first step, if the birds have liberty, will be to confine them closely where they can procure no food other than that supplied, which should still be the same as before, but diminished daily for about a week, when the birds should be again liberated and the food supply gradually increased and its nature altered till in quantity it is rather more than at the beginning and contains a larger proportion of protein and mineral matter. Feathers are largely made from these elements, hence the necessity for their liberal provision.

Possibly a few words as to the nature of protein, etc., may be desirable and helpful.

The majority of poultry-keepers are, we think, conservative and rather shy at a new theory, thought, or fact; especially if expressed in the language of science. They either regard it as something which it is too much trouble to worry about, or, else they promptly decide that it is all nonsense, and decline to have anything whatever to do with it. This is a mistake. The day of haphazard method in all departments of life is passing, and success is becoming more and more the prize only of those who want to know the why and wherefore of what they do, and act according to the knowledge gained, whether it is the feeding of a fowl or the breeding of a Clydesdale. A little knowledge, therefore, of the composition of the various foods suitable for poultry, and of the special purposes for which they are adapted, should be of value.

As there is no time at which this knowledge will prove more useful than during moult we shall try to explain, as briefly as possible, the scientific analysis and subdivision of foods, and further indicate how this knowledge may be used to our advantage. Protein and carbo-hydrates are not harder to say than, say, theatre, and circumstances, when one is familiar with them, and as the classification they indicate affords a basis for exact calculation, which the naming of foods, such as grain, green stuff, bran, and pollard, do not, it is a good thing to become familiar with them.

In the chemical analysis of feeding stuffs the following constituents are determined, viz, water, protein, nitrogen free extract, fat, and fibre.

— Protein, the Flesh-former. —

Taken in order of importance we find that protein is the name given to substances which contain nitrogen, hence the more familiar term, nitrogenous foods.

Substances of the same main division are also called albuminoids. This leads the beginner to some confusion, which will, however, be lessened if he fixes protein as the covering name for these classes, and remembers that albumen in an egg, fibrin in meat, gluten in grain, casein in milk, and legumin in peas, are amongst the principal sources of this constituent, which supplies the material necessary for the formation of lean meat, ligaments, tendons, feathers, etc. Its chief products are the white in egg; the cheese material in milk, etc. This again leads to some confusion, as albumen, for instance, figures both as a source and as a product. This is, however, explained when we remember that all life is a condition of change, involving continual consumption and renewal; thus, we find that the hen changes the protein contents of grain into the necessary nitrogenous element for her own maintenance, and puts off the surplus in the albumen of the eggs. Similiarly, the cow absorbs gluten and legumin and gives off caeein, and the bee turns the sugar of pollen into honey.

— Nitrogen Free Extract, or Carbohydrates, the Heat Producers.—

The next class, nitrogen free extract, includes starch, sugar, gum, etc. Substances from which this element is drawn are chiefly found in the vegetable kingdom.

This group is called carbohydrates, more generally designated heat-producing substances, which term clearly indicates its main office in nutrition just as flesh formers does that of the protoids

— Fats-hydro-carbons. —

A certain amount of fat is dissolved in the analysis of all foods It is essential to healthy bodily conditions; and if not supplied albuminoid a more costly element, will be dissolved to furnish it. This class differs from the preceding mainly in that it is richer in carbon and is more particularly the source of force or energy.

— Ash. —

Ash or mineral matter is the non-combustible part of the subject of analysis. Its amount does not vary greatly in different foods, its province is to provide the phosphorous lime, etc., for bonemaking, together with sulphur for feathers, muscles, and sinews; coloring matter is also derived in part from the ash.

— Fibre. —

Fibre is the framework of plants. It probably has some value in poultry feeding as a stimulus to digestion though it is frequently classed as waste.

— Water. —

Water may be regarded as a negligible quantity, except to remember that its proportion varies enormously in different foods ranging from under 10 to over 90 per cent. in some root vegetables; it is therefore obviously impossible for a hen to consume or hold sufficient food in the form of vegetables to produce eggs, or even maintain health.

Having now a knowledge of the different constituents of the foods and their functions it remains but to discover what proportions of the component parts of the foods (not the bulk foods themselves) are best adapted for the special purpose desired, whether it be eggs, meat, or feathers, plus maintenance; thus we should think in quantities of protein and fats, rather than in those of grain or green food. Were we left to puzzle questions of proportions of nutritive ratio out for ourselves we might justly perhaps say that it was not worth the trouble, but fortunately for us trained analytical chemists and practical poultry keepers have solved the problem, and it remains but to take advantage of the result of their researches, which have fixed the correct nutritive ratio at about one to four, which means that the food supplied each day should average as nearly as possible one part of protein content to four parts of carbohydrates. Thus it

(Continued on page 424).

Hints About Ducks.

(1) Do not attempt to catch the ducks by their legs; it is much safer to handle them by the neck; (2) Do not reduce their weight by taking a lamp amongst them at night; (3) Never throw dry lime in a duck pen: it kills; (4) Never select the largest duck eggs for hatching; they are usually infertile; (5) Ducks should always be locked in at night and kept on an absolutely dry, soft floor: they lay best under these conditions and the eggs are easily gathered; (6) Never hurry the laying ducks: it usually injures them; (7) The best remedy for duck ailments is plenty of sliced raw onion in the mash and an absolutely dry, soft bed; (8) Ducks should never be permitted to run with fowls: they both do better in pens by themselves; (9) When fowls and ducks are allowed to drink from the same vessel an outbreak of diseases may be expected; (10) Birds with crooked beaks, wry tails and similar defects should not be bred from.

The Value of Variety in Feeding.

— What an Experienced English Poultry-Keeper Thinks. —

The value of a change, or frequent changes, in the diet of our fowls cannot be over-estimated, especially at this time of year. Many of the birds are broody and others just thinking about it, while the rest, or the majority of them, are thinking of a new set of feathers. The writer has never analysed the size or strength of a fowl's brain, but if this is as much head-work as is required, they are not likely to suffer much from "brain fag." However, if they are liable to a fit of "nervous depression" now and then, why, it's only another incentive to a change; it will give them something fresh to think about, so that they'll forget their grievances—let us hope they are only fancied ones—and lay an extra egg or two in honour of the occasion; while those just thinking about a set of youngsters will have forgotten all about it, smacking their lips (I really don't know what a fowl does as an equivalent) over the new tasty breakfast. Those looking shabby and bare will be anxious to get the new set of feathers, so that they may return to business, and once more go strutting proudly round the yard, proclaiming to the world that there is another new-laid egg in the nest. To begin with, the breakfast should be of soft food. This in itself constitutes a change, and is far more beneficial than an "all-grain" diet. Of course, the "I-couldn't-be-bothered" poultryman will start grumbling at once on account of the little extra trouble involved; but then, his fowls would probably also start grumbling at the continued sameness of the hard corn diet, while the lazy poultryman would start grumbling again—at the decrease in the egg average. Never include maize-meal—in the morning mash. It may do for feeding pigs, but it won't do for poultry; besides, as it has to be scalded to get the full feeding value, it is far more trouble than it is worth.

Barley-meal, ground oats, and bran and pollard are admirably suited for a mixture, barley-meal predominating in winter, as it is more of a heating nature. Pea-meal or bran-meal may be included now and then as a change, but never use spices or condiments if it can be helped. The barley-meal may be stopped altogether once or twice a week in the summer. Add a little salt—it will greatly improve the flavour. Meat meal I find, is an excellent ingredient in the morn ng mash. We have only been using it for a few months. When this forms an ingredient, the birds eat the mash with a relish, where before they used to just peck at it. Some time ago our stock of meat meal gave out, and before the next meal gave out, and surprising how the birds "went off" their appetite. Even the fattening birds seemed to notice the difference, and gradually lost their appetites. But they soon pick up again when the meal is once more included.

Variety is also possible in the evening meal of corn, though not to such an extent as in the mash. Maize and wheat may be taken as the staple food. Maize is a fairly good food all the year round, but it should not be more than 50 per cent. of the mixture in the hot days of summer. Maize is a favourite with most poultry-peepers, especially as it is cheap—a great consideration to many. Wheat, at the present prohibitive prices, is not to be thought of; though it is a very valuable grain, and, in the summer, may now and again take the place of the Indian corn. Right through the cold winter months maize may be used alone and continuously, with good

results, provided, as I have before mentioned, that it is not included in any form in the morning mash.

Oats form a valuable addition to the mixture, but, when purchasing oats, it should always be borne in mind that a good sample must be procured, and in the end will be found cheapest. Cheap oats always contain a large proportion of husk, which is only wasted, as the fowls will not touch it. Barley may also be used for a change. It is of a fairly heating nature, and is, therefore, more valuable during the colder months. As with oats, it is better to select a short, thick sample, as they contain more nourishment and less husk than the long and thin ones.

Chickens and Perches.

If chickens will not roost on the perches, how they can be made do so is a question frequently asked.

In the first place it is very desirable that they should not have an opportunity of roostiog on perches until they are at least four or five months old, and their breast-bone has set. If they are allowed on perches while the keel-bone is soft there is a very great risk of them being crook-breasted, which ruins them for show purposes, and depreciates their value for the dinner table.

In a recent table poultry competition in another State it was noteworthy that only two breeders succeeded in sending in fowls none of which were crooked in the breast, and in these two instances the birds had not been allowed on perches. On the contrary, another breeder sent in 50 head, every one of which had its breast badly turned. In this case the youngsters had been allowed to roost on perches made of round saplings, 1½ to 2in. thick. The importance attached to straight breasts for table purposes is indicated by the scale of points adopted for judging in these competitions.

When the young stock are old enough to have perches without risk of injury, the perches provided should consist of battens an inch thick and 2in. to 3ins. wide, according to the size and weight of the breed. There are people now who do not use perches at all, and one finds individual fowls, too, that will not use the perches provided, and where the houses are roomy, with floors kept perfectly clean, there is not much to be said against this, though one is apt to look upon perches as more natural, healthier, and cleanlier. Then, again, if vermin give trouble, the fowls can be better protected from the night visitations of the red mite and other parasites of his tribe if swung perches are used.

So do not worry if the chickens do not take to the perches, and do not be in a hurry to induce them to do so. But take care that the floor they rest on is clean, dry, and not absolutely hard.—Exchange.

Practical Suggestions.

—For More Successful Summer Work.—

The breeding season being over, nothing is gained by allowing the cocks and hens to run together. If you propose exhibiting any of the birds, they will "fit" much better if separate. If you do not intend showing the fowls, the eggs will be better for use, especially if kept any length of time, if they are infertile. Your breeding males, moreover, will retain their vitality and sexual vigor much better if cooped alone for the balance of the year than if permitted to run with the hens. Keep looking ahead and consider the bearing on next season of all you do this year.

— Look Out for Lice. —

The increasing heat of summer will multiply the pests rapidly. Every bird that is individually cooped should be frequently dusted with some reliable insect powder, and occasionally taken out and allowed to "wallow" in some dry, dusty spot in the sun. A sun and dust bath combined is a grand preserver of health and an effective preventive of vermin. Lice in your young broods will work disaster. Give the hens cooped with chicks an opportunity of dusting themselves. Look over the chicks. The probability is that a dropping chick has head lice. Anoint the skull and throat with vaseline or sweet oil and see the results.

— Keep Your Coops Clean. —

Remove all droppings often. Scatter air-slacked lime around your houses. Wet the roosts and their supports with coal oil or lice paint. Do not let your growing chicks occupy dirty quarters. Move their pens to new ground frequently. A colony of weaned chicks will occupy the same house moved to new ground much easier and more readily than if you try to move them to a fresh house altogether. hence, have your houses, and brood coops easily movable, not fixtures.

— Provide Abundant Shade.—

If your fowls are exposed to the hot summer sunshiae all day, they will suffer. If you have not natural shade on your runs, set up a few boards or tack sacking or canvas on a frame so that the fowls may run underneath. Don't leave hens with broods in the burning heat of midsummer sunshine. Provide them with protection and they and their families will do much better.

— Give Fresh Water Often. —

Your young chicks especially need it. Water in shallow pans or metal fountains soon becomes tepid or warm. How would you like to drink such yourself? Cool, fresh drinking water is absolutely essential to healthy development of young fowls.

— Avoid Crowding. —

Separate the sexes, and remember that under the ordinary conditions of limited range that prevail with the great majority of breeders, twenty chicks will do much better together than forty. Give them room and you will reap better results than if you try to quarter as many together as possible. Many houses are none too good from a sanitary point of view, and many chicks die from the results of overcrowding in such unhealthy coops.

— Press Development Without Unnatural Forcing. —

If your chicks have had a good start during the first six weeks of their lives they will stand considerable pressure now. It is surprising how much food they will consume if it is given properly. Change the grains. They like variety as well as their owners. Bread is good—indispensable for us—but we would not like a continued, uninterrupted diet of it—bread! bread! bread! nothing but bread. So with the chicks. Wheat is good — indispensable — but vary it with other grains, greens and animal food. If your chickens have not free access to grass runs and the daily opportunity of finding worms bugs, you must provide substitutes or they will surely suffer from the lack. Variety is desirable in feeds and a surfeit is to be avoided. "Little and often" is a safe and profitable rule to observe. Do not spare your food; but do not waste it.

— Keep the Shows in Mind. —

Every day brings them nearer. Neglect now can not be remedied in a week or two. Everything you do now will affect your chances for good or bad in the show room, and if you hope to win then you must pay the price of success by constant vigilance now. If you would be ready for the invariable "hot competition" prevailing in your classes, prepare to-day and a little more every succeeding day, so the summer work will ensure success.

(Continued from page 421).

will be understood that neither wheat, barley, oats, etc., or their products are of special value other than as they lend themselves to the adjustment of these proportions in the day's food, and the substitution of one for the other of any of the foods may be to a great extent governed only by cost and convenience, and not by the individual value of any one grain.

— The Balanced Ration. —

This one to four nutritive ratio food or "balanced ration" is subject in some degree to varying influences, such as climate, season, etc., also to the age and physical condition of the flock, that is, whether the birds are growing, laying resting, or moulting.

For present purposes we shall only consider the variation applicable to the last of these conditions. It is found that during this period birds have a much-increased power of assimilating protein and mineral matter, which as we have seen are essential to the growth of feather, so that a ration in which the protein bears the higher proportion to the carbohydrates may be given with advantage.

It is found that with this treatment fowls which start the moult in a healthy and active bodily habit moult quickly without apparent discomfort, but with quick return to laying if the following conditions, also essential to success at this season, are present.

— Conditions Necessary. —

These conditions include perfect cleanliness in the house and yards, for the presence of lice and vermin is particularly injurious to moulting birds; an airy yet draught-proof house or the open air, but preferably protected roosting-places a dry, sweet yard, or open run for exercise, sharp grit in abundance, an ample supply of pure water and fresh green food. If these are provided the process, while it makes a heavy demand upon the system of the fowl, need not in any degree injure the health and usefulness of the birds, and they will come out of it with renewed vigor, resplendent in new garb and prepared to attend to the business of life with pleasure to themselves and profit to their owners.

We append a table of the analysis of a number of the more common poultry foods, from which we hope readers will gather information which may induce some of them to get a grip of the subject and give scientific feeding a trial.

Feeding Stuff.	Ash.	Fibre.	Nitrogen free extract carbohydrates.	Fats. hydro carbons.
Wheat	1.8	1.8	71.9	2.1
Barley	2.4	2.7	69.8	1.8
Ogts	3.0	9.5	59.7	5.0
Maize...	1.5	2.1	69.6	5.4
Sorghum seed ...	2.1	2.6	69.8	3.6
Rice	0.4	0.2	79.2	0.4
Wheat bran... ...	5.6	8.4	53.7	4.2
Pollard	4.5	1.5	57.0	4.0
Oatmeal	—	1.5	63.5	6.0
Pea meal	2.6	14.1	51.1	1.2
Brewers' grains (dried)...	3.6	12.3	47.9	6.3
Linseed meal ...	5.8	9.5	38.5	3.0
Rape	2.0	2.6	8.4	0.5
Pumpkins	0.5	1.7	5.2	0.4
Apples...	0f5	1.5	12.5	0.3
Meat scraps ...	4.1	—	0.3	13.7
Dried blood... ...	4.7	—	—	2.5
Sk m milk	0.7	—	4.7	0.8
Butter milk ...	0.7	—	4.0	1.1
Whey	0.7	—	4.8	0.3
Lucern (green)	2.7	7.4	12.3	1.0
Lucern (dried) ...	7.4	25.0	42.7	2.2
Clover (green)...	2.1	8.1	13.3	1.1
Clover hay	6.2	24.8	38.1	3.3
Wheat stra w...	4.2	38.1	43.4	1.3
Oat straw	5.1	37.0	42.4	2.3
Sunflower	2.6	29.0	21.4	21.5
Green bone	24.0	—	—	26.1

The table above is compiled from Woll's "Handbook for Farmers and Dairymen;" Jenkins and Wintonls "Compilation of Analyses of American Feeding Stuffs;" and Wright's "Book of Poultry." The water content is of no value and is not stated, but is represented by the difference between the sum of the figures quoted and 100. Thus, in wheat the sum is 89.5, showing a difference of 10.5, which is the water content.

Poultry Shows are the Life of the Standard-Bred Industry.

From the Reliable Poultry Journal

All farmers should be successful poultry raisers, and the majority of successful poultry raisers become fanciers in time, but it is true that much of the improvement of standard-bred or utility poultry has been accomplished by the city and village fanciers. It is also a fact that the best fowls raised and exhibited at the poultry shows in America are produced by the city lot fanciers. Yet when we consider the naturai advantages which the farmers have over these fanciers, it seems incredible that so few farmers make the most of their poultry opportunities. The city and village fanciers have everything to contend with, while the farmers apparently have everything in their favor, except their own indifference to the poultry business.

The fact is, the great body of fanciers are men of other pursuits, whose income is sufficient to provide the extra outlay without inconvenience. The dweller in the city or village who becomes a fancier is first attracted to it because of his love for pets, or he has taken it up as a fad, a pastime, or for recreation from the cares and toil of every-day life. To a certain extent it is an intellectual pursuit, and the labor is light, easily making it a means of recreation. In the beginning it is rarely taken up as a business, and as a rule, the fancier is not obliged to require it to pay even its own way. Quite frequently he is willing that it should not do so. His aim is to obtain or rear at any cost the most perfect specimens of his breed, according to his ideal, and this is the secret of much of the good which results from his efforts.

The average farmer has not the same incentive, or even love for his fowls, because the larger animals around him seem to be of more importance, claiming his whole attention, and it is easier to become fond of them. Neither will the farmer think of fowls as in any way being a factor for intellectual observation. In fact, the farmer has at first no use for a hen, so far as there is money to be made, yet he is not slow to take advantage of improved breeds and methods after once being satisfied that it pays. Attract his

attention and give him an opportunity for observation, and you will soon find him making inquiries.

Herein lies the educational force of poultry shows and exhibitions. More persons become interested in standard-breed poultry through the medium of poultry shows than in any other way. This has been demonstrated within the past few years where the leading exhibitors of our great poultry shows have sold thousands of dollars worth of eggs for hatching and fowls for breeding purposes to the smaller fanciers. In addition to this, our exhibitions have developed a good-natured rivalry among breeders and have created a pride in the possession of choice specimens, not only among the poultrymen, but among the wealthy and well to do classes.

Having succeeded in establishing a good pure-bred flock, the next important step for the breeder is to let the public know what he has, and while advertising in the poultry papers is the very best medium, yet the show ring must not be neglected. The poultry show is the stimulator, yes, the life of the standard-bred poultry industry, and neither the novice nor the veteran fancier can afford to neglect the opportunities it affords. They should not fail to give it their enthusiastic support, both personally and financially.

The class in the poultry show to which your chosen variety belongs should be well filled, and you should help do it, because to the general public the prestige of any variety is largely measured by the estimate the fanciers themselves put upon it. The breed having the largest exhibit in the show is readily supposed to be the most popular. The larger exhibits naturally attract the most attention and give greater opportunity for investigation and inquiry, and when added to this, you have the best fowls on exhibition in that class, you will realize a handsome income from your fowls. The popularity of a breed is what gives it the money-making power in the hands of the fancier. A person who for the first time sees the much talked of standard-bred fowls at the poultry show cannot fail to contrast their own chickens at home with those placed on exhibition at the poultry show, and the object lesson is a lasting one.

To the novice the poultry show is a veritable school room where the kindergarten method is used, teaching by living examples the possibilities of poultry culture, strikingly exemplifying the difference between a standard-bred and a common-yard fowl. He can there find his ideals realized in flesh and blood and feathers, and it seems to him like a dream come true. When the judge has passed upon his pets, using the score card method, he can quietly examine his fowls at home section by section, comparing them with the records made on the score cards, using his preciously acquired knowledge of shape and color, and he begins to know some of the points of a good specimen. His knowledge now begins to be an experienced fact, not a theory only, and the result is that he acquires more valuable information concerning the good qualities of a standard-bred fowl by a few seasons' patronage of the poultry shows than he would otherwise learn by a lifetime of study and his own personal experience. To the old fancier the poultry show is the arena for a battle royal, the supreme test of the result of his labours in the year just past.

"Fate sends thee here in doubt-
 But soon we are beyond her
  power,
For on this chosen battle plain
 Victor or vanquished, I remain."

How his heart swells with pride as he beholds his pets on display in the show room. He has watched and cared for them from the time they left the shell and he believes them to be among the best of all on exhibition. His reputation as a breeder depends largely upon his success at this show. When the judge has passed upon them and later the blue ribbons adorn his cages, he has full recompense for his care and trouble, in the gratification of knowing that he has been victorious over his competitors. Not only that, but he knows that the reputation these winnings give him will bring numerous long-priced sales of stock and eggs for hatching.

Send your fowls to the poultry shows and go there yourself. Be on hand prepared to answer inquiries concerning your fowls and to present their claims for popular favor. You will find this a valuable aid to your most profitable advertising.

Successful poultry raising and egg production go hand in hand with care and shelter.

Common Sense in Buying Poultry.

Many poultry keepers have no doubt thought what a pleasant and profitable hobby, or business poultry keeping would be, were it not for the constantly recurring feeding bills. Unfortunately no one, not even our worthy poultry expert, has yet been able to devise a means by which they may be avoided—except through the bankruptcy Court which can hardly be considered satisfactory. Though they cannot be avoided their severity may be somewhat mitigated by the exercise of the common sense proceedure of buying the necessary supplies direct from the grower. We do not claim any great originality for the above suggestion. It is we are aware not exactly the first time which it has been made. We have been led to repeat the dose by the receipt of a letter from Mr. J. R. Beck, erstwhile of Adelaide and the Grange, who will be remembered by many of our readers, as an occasional contributor to these columns, and a breeder of Rouen ducks, black leghorns and various other fowl, besides for other and more important reasons. Mr. Beck is now a wheat grower,—we are glad to know a very successful one,—but he does not forget his poultry keeping experience. He writes that he will be pleased to hear from any poultry keeper who wants to buy good sound grain. We do not wish to suggest that Mr. Beck is setting up as an amateur philanthropist. It is merely that he desires to place before poultry breeders the opportunity of doing away with the added cost which much handling and the several profits involves.

We think that every poultry keeper whose wheat requirements may amount to anything from one bag upwards, will be wise to let our friend know what he is paying and what quantity he can take. Mr. Beck will then let him know whether he can better it and by how much. Mr. Beck will only send out guaranteed f.a.q. grain. Short of growing wheat or stealing it we do not know of a cheaper way of getting it. We nearly forgot to mention that Mr. Beck's address is "Kirkcaldy," Hooper.

Protrusion of the Egg Passage.

Reply to "R. J."

The complaint is generally the result of over-fatness, and is caused by a bird straining to expel an egg, thereby weakening the walls of the cavity, and causing them to fall down, or become, as it were, turned inside out. Your hen is undoubtedly too fat, either by partaking of too much food, or by being fed on food of a fattening nature. A handful of soft food (prepared), and one of grain to each fowl is ample for a day's allowance ; in fact on a large grass run hens will keep in capital health and will lay well with much less. We advise you to reduce the bird's rations, and to remove from the bill of fare any meal, grain, or food that is likely to fatten. The greatest care must be taken with the feeding, and the birds should have a constant supply of shell-forming material (ground oyster-shells are good), grit, and fresh water. An iron tonic added to the drinking water will doubtless prove serviceable. In order to attempt to cure the fowl that is suffering, proceed as follows :—Gently scrape away the skin covering the egg, should there be one there, and remove it ; then wash the bowel with tepid water or strong warm tea by pouring it upon the protruding part, and gently replace it by pushing it into the vent with the finger covered with a piece of fine linen rag, holding the hen with her head downwards, and afterwards withdrawing the rag. A small syringeful of 10 per cent, solution of alum in water injected afterwards into the vent completes the treatment, giving a teaspoonful of sweet oil each morning, and avoid feeding with irritating food. We have known bad cases to be successfully treated as follows :—After gently placing the part back, the bird should be wrapped in a bag of thin canvas through which she can easily breathe. Allow the legs to be outside, but bind the wings so that she cannot flutter. She should then be placed in a sling, the head and shoulders being about 3 in. lower than her abdomen. A roller-towel is a good thing to use. The bird should be allowed to lie in this position for about six or eight hours, and the egg-passage will fall into its proper place without forcing the bird to strain herself in trying to get it back. If the prolapse is, however, considerable in extent, the hen should be at once killed, if she is not valuable for her edible qualities are not injuriously affected.

— Yolkless Eggs. —

In some cases yolkless eggs are the result of a diseased state of the egg organs, and in such instances the supplying of non-stimulating food for a time may have a beneficial effect. Yet again, what you complain of may be due to the fact that the oviduct (the organ from which the yolk obtains its several coverings) is temporarily more active than the ovary which furnishes the yolk. Such cases are not uncommon. But should your hen continue to produce yolkless eggs you may conclude that her ovary has been destroyed in some manner. In such circumstances, we need hardly add, no cure is possible.

Distinguishing the Sex of Geese.

It is very difficult to speak positively of the sex of geese, therefore all sorts of expedients are resorted to, some people trusting to one and some to another. The gander is supposed to have a shorter and thicker neck than the goose. He is said to have the bag between the legs single, while that of the goose is double. In adult birds the sex may be discovered by examination. Many people try them with a dog —; sometimes "hard" on the dog. If the birds are shut in a small place like a pigsty, and a dog is put in, the ganders will lower their heads and hiss at the animal. Perhaps the best way of all is that suggested some time ago by a contributor : "I presume the birds are nearly fully grown. If so, take notice of the voice. That of the gander is a thin, clear, silvery—if I might say—murmur ; that of the goose a deep bass. The beak is much thicker. The under mandible of the gander is also more full than that of the goose, which appears to be shrunken round the nostrils. I have been able to pick the birds out when they have been only a day or two old by noticing their heads, which are larger, more full rounded than the goose. It will be advisable to notice the beak as well at this stage. I may say I have bred the Toulouse variety two seasons, and have noticed this in the goslings from the first, and I was only once mistaken."

Egg-Eating Fowls.

To test whether fowls are egg-eaters or not, put an egg in the run. Let it be a brown one if the hens lay brown eggs or a white one if a breed is kept which lays white eggs. When the bird notices the egg, if she only rolls it over with her beak, it is a pretty good proof that she is not an egg-eater but that she has sometimes helped the other hens to eat an egg. If they do not know the taste of an egg, they do not turn it over and the fact of their rolling it over is a proof that they expect to find a hole in it ; these birds can really be called egg-eaters and should be dealt with accordingly.

Pigeon Notes.

Diseases in Pigeons.

From "Pigeon Keeping."

— Diarrhoea. —

The symptoms of this disease are a looseness of the bowels, sleepy look about the eyes, ruffled feathers over the frontal, and a dejected appearance of the subject.

Youngsters in the nest quickly succumb to this disease if not taken in time. When fanciers see that the droppings of their birds are watery the cause must be seen to at once.

The excessive partaking of water through eating too much salted grit in hot weather will also cause it.

But the most serious cases are when the birds go to the heads and partake of nitrate of soda, or earthy matter saturated with this, which, if taken in excess, will not only cause incessant diarrhoea but death.

New wheat or new corn will also cause it.

Mouldy grain will cause it, and particularly will it arise from birds eating grain contaminated by their droppings.

A hot, close loft, imperfect ventilation, the accumulation of the droppings on the floor will all bring about the trouble.

In the breeding season birds will generally go into the fields and eat worm-castings. These cause the bowels of the youngsters in the nest to be free in the morning, but as soon as they get the hard corn in the crop and it passes through the system the droppings during the night are firm and solid. No uneasiness need be felt in these cases.

If persistent, look to the corn. If too new, change to something a little older. Whatever you do, avoid maize; this, if of poor quality, will induce diarrhoea more quickly than anything.

Try a little old baked English wheat or good sound peas two years old.

A gentle aperient in the shape of a dose of castor oil will sometimes effect a cure if taken in hand at once. Diarrhoea is the forerunner of many evils.

When the droppings are loose and greenish two drops of chlorodyne will sometimes at once effect a remedy, but when the disease affects the majority of the inmates of a loft the cause will generally be found in the food and feeding.

In some cases I have found a teaspoonful of camphorated chalk added to a quart of water effect an immediate cure.

The disease is more common in hot weather, and bad ventilation and overcrowding will cause it.

— Eating Droppings. —

If pigeons are kept very short of corn they will acquire the filthy habit of eating their droppings, particularly if any husk is passed, or if bad linseed is used, which through its hardness may be passed through the digestive tract in the same manner as small grit or stones that the gizzard expels that it has no use for.

A pigeon's teeth are in the gizzard in the shape of grit, but here let me briefly describe the process it goes through before reaching the gizzard.

First of all, the food, after being eaten, passes through the gullet into the crop. It is surprising to what extent it swells. At the bottom of the crop is a receptacle which looks like a subterranean passage; that is the stomach of the pigeon, where the food eaten is mixed with chile, and is still further softened before passing into the gizzard, where, as I have stated, mastication takes place, and if the food is good and the pigeon healthy, only waste matter is thrown off, and eventually is discharged in conjunction with urine from the rectum.

It is a very bad sign indeed for pigeons to pass the grain they eat through their system without digesting it. Depend upon it, there is something wrong either in the grain or the bird.

I have frequently found in the case of bad linseed and some other small seeds pigeons will pass them in this manner, and being passed whole the hungry birds will eat them again and at the same time eat their droppings. Plenty of good digestible food is the best remedy for the trouble.

— Egg Binding. —

Frequently in the early part of the year young hens have trouble with laying their eggs. Generally the cause is through being too fat or weakness.

They will be found sitting on the nest moped up night after night with the vent swollen and hot. When walking about the loft they look miserable and the feathers are ruffled.

Sometimes the trouble arises through the egg being abnormally large.

The best remedy is to hold the bird's vent gently over steam from a jug, taking care not to scald the parts, or hold it in warm water for half an hour so as to relax them. Administer a dose of castor oil, and then anoint well up the vent with hot olive oil applied by means of a feather, gently pressing the parts to help the passage of the egg. It is

not advisable to handle birds suffering from egg-binding too much.

If the above treatment fails an operation may be necessary to remove the egg, but if undertaken by an unskilled person will generally prove fatal.

— Feather Rot. —

This is one of the worst diseases I know, and, unfortunately, in latter years has become more common than formerly.

I cannot find in any of the old pigeon works a single reference to this disease. My old edition of Fulton is silent with reference to it.

Lyell does not speak of it.

Nor is a single reference made in any of the Belgian works.

Why is this the case?

Is this disease a modern one, and is it common to this country only?

Feather-eating fowls I have seen denuded of their feathers.

I have also owned feather-eating or plucking parrots.

But the disease known as feather rot is altogether of a different nature to either of these troubles.

It is becoming common in some districts, more so than others. It frequently attacks most valuable birds.

I have visited Belgium pretty regularly for nearly twenty years past, and yet I have never seen a single case there of feather rot.

As I have stated, none of the Belgian books I have read refer to it. Why should English birds be prone to it and not Belgian?

I have kept pigeons over thirty years. During this period I have had three individual cases of feather rot.

They arose in different strains and different birds.

Still, I have had a number of cases sent me by young fanciers for advice and examination.

After most careful consideration I am inclined to think that the disease, as we know it, commonly called feather rot in this country, must be classified under three different headings: 1, disease of the blood; 2, skin disease, parasitic; 3, atmospheric.

The symptoms of feather rot are that the feathers become rotten and fall out. First the chest is attacked with bare patches, then follows a looseness in the shoulders and wing-coverts.

In both cases one and two the symptoms are generally as described, but in the case of three the flights and tail apparently become brittle and rotten, the webbing breaking off in flakes and particles, and having the appearance as though eaten by some feather-devouring mite.

The disease generally makes itself known in the breeding season.

Birds suffering from feather rot will moult at the same period as others, but the bloom and sheen that is to be found on a healthy bird does not last; the feathers become dull and dry, and as sure as the breeding season again comes round after the first nest is reared the disease again makes its appearance, more marked than before, until in bad cases the whole body may be denuded of feathers.

Cause 1 (disease of the blood) is due to the kidneys not doing their work properly. Earthiness of the system arises, and there is no proper secretion supplied to the feather-glands.

If I am right in assuming that one form of the disease is due to kidney trouble or blood disorder, what is the best remedy.

I have noticed that the disease in this form is more prevalent in localities near the sea and where salted grits are obtainable than in other districts.

If the gizzard and the kidneys are given too much work to perform the blood immediately becomes disordered.

Improper grit, salt "cats," that induce birds to eat more grit than is good for them, or salted shingle from the sea beach eaten too freely as grit by the birds will, in my opinion, induce this disease more quickly than anything I know.

The disease when it arises from Cause 1 is hereditary, but if the environment is changed and if the management of the birds when at fault is changed the descendants will not show any traces of the disease whatever, and I have known cases where neither the ascendants nor descendants of the affected bird have shown the least taint.

In the case of a valuable bird that is affected a cure may be effected by the following treatment. After the moulting season separate the subject, and don't allow it to breed in the spring.

Feed on good peas, tares, and beans, not too old.

Avoid hemp seed, canary seed, or small heating grains.

Do not give any artificially-salted grits until the patient is well again.

Occasionally give a 5-minim capsule of olive oil in order to regularly purge the subject, which is very essential, and administer capsules of Parrish's chemical food twice weekly.

The bath should also be in constant and regular use.

After a season's rest from breeding, when the moult has taken place, the feathers will be stronger, richer, and more lustrous, and the birds will probably show no more symptoms of disease. In all cases where the disease is due to kidney and blood trouble as I have described, the birds become heavy and the skin hot and there is difficulty in flying and breathing.

King's Compo. and Poultry

Now that the summer sun is beginning to assert his power in earnest there are many poultry keepers and more poultry who wish that some kindly hand had given their home and habitations the benefit of a coat or two of Compo. Fowls are not fastidious as to architecture or decorative effect, but they do like a reasonable degree of coolness, and what is more, are quite prepared to pay for it. There is no question but that this preparation has proved of very great value in mitigating the too fierce attentions of Old Sol. So much for Compo from the strictly utility point of view. There is another side of the question — the decorative. It is certainly true that neat and tidy yards are of definite help in selling stock — so, too, with the houses. A coat of Compo with its fresh and cleanly appearance is sufficient to redeem some of the weirdly constructed fowl houses of Suburban Adelaide. It is, of course of equal service for Kennels, Stables Cow Sheds, Trap Sheds, and last but not least, the roof of the dwelling house. Many who have used King's Compo acknowledge the greater comfort enjoyed through its cooling influence. The inventor of King's Compo is really a public benefactor for placing on the market a substance by which so great a change in temperature and appearance can be so cheaply effected. People speak of picturesque Adelaide, and so it is until one looks down from a height on the unending iron of its roof tops. Compo in its natural state is white, but it readily joins forces with Venetian Red, Yellow Ochre, or Prussian Blue etc., so that buyers of a tin may paint his roof a modest white, or cause it to assume a coat of many colors.

Home Notes.

SILVER TEA POTS.

Where such a tea pot is used only seldom, it is apt to acquire a nasty odour, which can be prevented by being filled with hot water and soda, allowed to stand for a few minutes, and then rinsed out, and dried thoroughly. When you are quite sure there is not the slightest suspicion of moisture in the pot, drop in a piece of sugar, and put the teapot away.

SMART WOMEN.

I am afraid this adjective is not often used in a complimentary sense. Smartness too often is another name for down-right vulgarity, and coarseness of manner. However well dressed and even handsome a girl or woman is, if she lacks refinement, daintiness of speech and manner, and womanly ways, she loses considerably in the eyes of men. A few days ago I was in a metropolitan car, when a fine-looking, well-dressed woman boarded it and entered into conversation with two men, evidently friends. When she got off I could not help feeling sorry for her, or rather for her sex generally, when one said to the other: "Looks well always, does she not?" "Yes," was the reply; "well-dressed, but how horribly flippant and vulgar is her tongue!" This little incident speaks for itself.

ABSURD NOTIONS ABOUT SUPPER.

So much nonsense is talked about suppers that one wonders how long people will dispute over the wisdom of taking supper or going to bed without it. It is just as true that to go to bed fasting is as much a cause of sleeplessness as that a heavy supper induces restlessness and a sort of sodden slumber, from which one awakens quite unrefreshed. Healthy people very naturally require some slight nourishment, and common sense suggests that it is better to satisfy the appetite with something light and digestible than to upset the system with a too "solid" supper or by taking none at all. A glass of hot milk, or chocolate and (according to Sir Francis Laking) some currant bread, eaten about thirty minutes before going to bed, is both sufficient and entirely suitable. The King's physician says that currants contain more brain and body-building properties than almost any other food, and he strongly advises that plenty of these little dried grapes should be used daily. We anticipate that the intelligent housewife will readily appreciate the remarkable food value of currants, and it is easy to foretell that to adults and children alike currant bread will be as welcome as it is nutritious and wholesome.

THE DIET QUESTION.

What a pity it is that women will not realise that there is a certain diet for every case. The girl with thick, muddy, or spotty skin should eat apples, figs, prunes, well-boiled carrots and water-cress. Thin people may take bananas, rice, butter milk, Brussels sprouts, turnips, and sardines, etc. Women with too much color should eat fish and poultry, and a little meat; take plenty of exercise, and tepid baths should be taken. An anaemic woman should eat fresh beef, underdone, plenty of milk, cream, brown bread and butter, and milk puddings; claret she may also take, but no spirits, as they will impoverish the small quantity of blood she has.

WASHING DRESSES.

A woman whose cotton dresses never fade washes them in this manner:—For light colours, four quarts of flour starch are made and strained. Half of this is put into two pails of soft water, in which the garment is washed until clean. Water is then added to the remaining half of the starch, and in this the dresses are rinsed. They are dried and ironed on the wrong side.

A PRETTY GARNISH.

Every housewife should make her table look as nice as possible, and here is a very dainty little garnish which may with advanatge be used for special occasions. Cut some lemons and cooked beetroot into thin slices, and arrange them in pairs of equal circumference. Now cut a slice of lemon into the shape of a Maltese cross, and lay it on its corresponding slice of beet; cut the next slice of beet into a cross, and place it on a slice of lemon, using up all your material in the same way. Finish each with a tiny sprig of parsley stuck in the centre of the cross, and you will have a quantity of decorations which will make any cold meat dishes look attractive.

TREATMENT OF BILLIOUSNESS.

Even where there is the so-called bilious diarrhoea, it is often useful to commence with a laxative mixture rather than with pills. Thus, the following may be taken three times a day for four days, one hour after food:—Rhubarb, 10 grains; soda bicarbonate, 20 grains; syrup of ginger, 60 drops; ipecacuanha wine, 1 drop, in an ounce of infusion of calumba. When the mouth is very dry a drop of ipecacuanha wine in a teaspoonful of water every quarter of an hour for two hours, and then every hour, should be taken for several days, beginning anew every morning with the quarter hour doses. Or, five drops of tincture of podophyllin, with food, may be taken for some little time.

All kinds of spices, fats, pastries, and sugars should for a time be avoided, but lean meat, and milk, and partially digested starchy foods can be taken.

SHE CAN'T SUCCEED.

The woman who starts out without any practical training.

The woman who can turn her mind to anything, and does nothing thoroughly.

The woman who expects to begin at the top, instead of slowly climbing there.

The woman who spends her nights seeking amusements, or in "society," instead of rest and recreation.

The woman who is never in time.

The woman who is hampered by unsuitable dress.

The woman whose thoughts are all on her appearance, and the impression she is making.

The woman who makes every casual acquaintance a bosom friend.

The woman who is stiff and unsocial, repelling all friendly advances.

The woman who lets pleasure come ahead of her work.

The woman who talks too much.

Household Hints.

Never use a metalled spoon for stirring stewed fruit or tomatoes. A wooden one is better, and those with short handles are preferable.

Meat may be kept in the hottest weather by the following method :—Make a large muslin bag, dip it in vinegar, wring it out as often as may be necessary and then hang the meat in it. Do this each day, and be careful to hang it in a current of air.

For large shoes which slip at the heel glue a shaped piece of velvet to the inside bottom, and side of the heel, and it will cling to the stocking.

Suet puddings are most nourishing if the suet is chopped as fine as possible, and the whole thoroughly well boiled. Any suet left over will keep good for weeks if melted down in a saucepan, strained and stored in a covered pot.

When baking a cake, if your owen is inclined to burn, fold a newspaper and put it on the shelf under the tin. A basin of water in the oven will also help to prevent things from burning, and many people think that the steam from the water helps to make cakes rise.

An easy way to soften water delightfully is to throw orange-peel into it just before the water is used. The peel will not only prove agreeable to the skin, but will give a delightful fragrance.

The dents in furniture may be taken out as follows :—Wet the part with warm water, double a piece of brown paper five or six times ; soak it in warm water, and lay it on the place ; apply on that a warm, but not hot, iron until the moisture makes the wood swell and fill the dent.

Dishcloths must be washed after using if they are to be kept sweet and nice. First wash in a lather of soap and water, then rinse in clean hot water, and hang out to dry. One of the nicest kinds of dishcloths is made of knitted soft cotton, which will wash again and again, and look as good as new.

The best egg test is to put the egg in water. If fresh it will sink and lie horizontally on the bottom of the vessel, when from three to five days old it will rest at a slight angle, the large end uppermost ; if eight days old it will assume an angle of about 60 deg. ; if three weeks old, about 70 deg. ; and after four weeks old it will stand upright.

Clean flannel dipped in paraffin oil will satisfactorily remove finger marks on polished or painted wood if rubbed on for a few minutes. Wipe with a clean cloth wrung from hot water to remove the odour.

An excellent carpet renovator to be used in the weekly cleaning is a half tumbler of spirits of turpentine in a basin of water. After the regular sweeping this should be applied by dipping the broom in the mixture and lightly brushing the carpet with it.

If troubled with fleas in the house an effective way to get rid of the intruders is to sweep the house well with salt. Then each day brush under the bed and in the corners with salt strewn liberally everywhere. Fleas are not fond of salt, and, though a few stragglers may remain for some days they will not hold out long against this treatment.

Iron the silk front of embroidered stockings with a warm iron to make them bright and shiny.

To keep brown shoes clean and new-looking, rub well first with a piece of cut lemon and then with a little salad oil, milk, vaseline, or boot polish.

People who at night are troubled by mosquitoes should rub camphor on the pillow to prevent themselves being stung. A little spirit of camphor rubbed over the face answers the same purpose.

Stockings which are to be worn again before being washed should always be turned briskly inside out, much of the dust is by this means removed. To further remove that which so quickly works in above the shoe top, brush lightly while the stocking is thus turned inside out.

When a room is turned out and the pictures are being cleaned, change their position before hanging them again. Often a picture is by this means noticed and admired afresh by the inmates of a house. It would, otherwise, probably escape attention from the the very fact that it is always in the same place. Adopt this plan of change in other articles, both ornaments and furniture. Remember always, "variety is charming"

To stimulate the growth of the hair hold the bristles of rather a soft brush close to the head, touching it. In this position work the handle about in a circular direction, keeping the bristles in the same place, and pressing lightly on the skin of the head. Move the brush from place to place, and continue the action. The stimulating effect is felt at once, and the hair is afterwards fluffy and easily dressed.

When lemons are not procurable, which is frequently the case in the country, a substitute for lemon juice may be prepared as fol-

lows:—Take six tablespoonfuls of best vinegar (preferably Seppelt's white wine vinegar), and add to it six drops of essence of lemon and a teaspoonful of castor sugar. Stir it until the sugar is dissolved, and use it in the same way and for the same purposes as lemon juice.

Rabbit Skin Mats.

Comfortable and durable bedside mats can be made from the skin of the "bunnies" which have been killed for the table. As soon as the skin is taken from the animal, slit it up to the head and to the tail, and stretch it out flat, fur downwards, on a board, and secure it in shape with a few tacks. Dissolve a teaspoonful of salt, and one of alum in half a teacup of hot water; moisten the skin with this; let it dry, and repeat twice. Remove the tacks, and the skin will be hard. Two or three skins, cut to the same size and sewn together on an old piece of carpet, make a very nice little rug.

Care of Piano Keys.

If the lid of a piano is kept continually closed, the keys are certain to become yellow and discolored; therefore, after the room in which the instrument stands has been swept and dusted, the piano should be opened and the keys exposed to the strongest light available. It is an excellent thing to stand a piano as near to a sunny window as possible.

Should the keys be badly discolored, the ivory may be bleached by rubbing them over with a pumice stone moistened with just a little water, and exposing the keys, while still damp, to strong sunlight.

This treatment may have to be repeated several times before the bleaching will be satisfactorily accomplished, and very great care should be taken to avoid damping the woodwork of the piano.

A new rat-trap may now be obtained. The bait, a piece of cheese is attached to an electric wire, and no sooner does the unfortunate rodent takes a bite than he receives a fatal shock.

Tried Recipes

— Dressing for Fowl. —

Two onions, five ounces of soaked bread, well squezeed, a few sage leaves, one ounce of butter, one egg, a small piece of well-minced pork, salt and pepper to taste, and a little celery. Mince and fry the onion before adding to the other ingredients.

— Creamed Almonds. —

Flavour the cream with almond extract and form into small cubes. Press an almond into the centre of each, and roll in coarse sugar, or in chopped almonds, as preferred. It is customary to use the almonds without bleaching, as the flavour is finer.

— Snow Cream. —

Beat the whites of three eggs to a froth, add gradually three rounding tablespoonfuls of powdered sugar. Beat until very stiff; flavour with one tablespoonful of sherry and half a teaspoonful of vanilla. Add gradually half a pint of whipped cream, measured before whipped. Stir it in very carefully and serve immediately in glasses.

— Peach Pie. —

Bake a shell of dainty puff paste, filling iit with rice to prevent its raising in bubbles, or shaping it on the outside of a pie dish. When the shell is done put in a half-inch layer of stewed and sweetened peaches to which three chopped kernels for every eight peaches cooked have been added. Fill up the crust with uncooked peaches, the ripest and sweetest to be had. Add sugar enough to sweeten them well, and set the pie in the oven for about three minutes to melt the sugar; then set it away to cool. Heap with whipped cream before serving.

— Omelette Souffle. —

Beat the yolks of three eggs until light, add one-fourth teaspoonful of vanilla. Beat the whites of six eggs to a froth, add gradually three rounding tablespoonfuls of powdered sugar, and beat until very stiff. Pour over this the yolks and mix carefully. Place in scallop dishes or an small sauce dishes, sift powdered sugar lightly over the top, place in a moderate oven for from three to five minutes, according to size. Serve at once.

— Peach Short Cake. —

To make the ideal old-fashioned peach short cake, a very short biscuit dough must be made. Roll out the dough into two very thin loaves; place one in the bottam of a dripping pan; next spread the top with butter, cut peaches and sugar, and then place on top the other piece of biscuit dough, and lay specially fine bits of peach around it as decorating, with a trifle of butter and sugar to make them candy and not dry. Bake the short cake in a quick oven and serve with a whipped cream sauce.

— Chocolate Cake. —

A plain chocolate cake is made with a cup of sugar, the yolks of three and whites of one egg, and half a cup of sour milk. While this cake is being prepared, dissolve half a cup of finely scraped chocolate in another half cup of sour milk, adding to the dissolved mixture half a cup of sugar. Cool this chocolate preparation and then add it to the cake mixture. Flavour the cake with a teaspoonful of vanilla and add finally two cups of flour which has been sifted twice with an even teaspoonful of soda. Bake the cake in two layers, and put a thick layer of white icing between and over them.

— Rolly-Polly Pudding. —

Six ounces of suet to eight ounces of flour (ordinary, not "self-raising"), using more flour to roll or put upon the board. Do not chop the suet too small—say to the size of small peas, using a little of the flour. Put the flour into a basin, and mix the suet with it. When all is mixed, add by degrees enough water to make into a smooth, stiff dough, knead in the basin a few minutes, then put it upon the paste-board, roll out from you to the thickness of three two-shilling pieces placed upon one another, then spread the jam, but not too thick, roll over with floured fingers rather tightly. Have your pudding cloth ready, which must have been wrung out of cold, clear water. Roll the pudding in it. Tie the ends with one piece of string (not in a knot, in a bow), take it across the pudding to the other end, and tie in same manner, pin the centre with a safety pin; the string enables you to turn the pudding often, and also to take it up.

— Ribbon Cake. —

The weight of three eggs in butter, sugar, and flour, and a small teaspoonful of baking powder.

Divide into equal parts, and add to one 2oz. of chocolate, the other plain. For the pink two eggs, their weight in flour, sugar, and butter; a little vanilla flavouring, and a small teaspoonful of baking powder and enough cochineal to colour. Join the chocolate and pink with chocolate icing and the other with sweetened whipped cream.

Here is another cake. Cut the sponge cake into square pieces a little larger than dice, colour one-third pink, one chocolate, and the last portion leave its own colour; then place them side by side alternately in a box or mould, stick into form with jelly or jam or whipped cream.

— Potatoes. —

Few cooks know that potatoes for a border should be baked in their jackets, and not boiled.

For a reasonable size entree ten potatoes will be sufficient. Bake in a good oven, and when done rub the whole of the flour through a fine wire sieve into a basin. Set the basin into a stewpan, and place over the fire; then add to the potato flour 2½ozs. of butter, the yolks of four eggs well beaten, and a good tablespoonful of cream. Season with pepper, salt, and grated nutmeg. Stir well with a wooden spoon until all is of a hot smooth paste. You may then shape it to any design you may choose, or make a border with the mash, as you would a casserole of rich. When it is well moulded, brush it all over with beaten egg, using a soft paste brush. Bake to a light biscuit colour.

If a well is required for any ragout, scoop out the centre and smooth over with a heated spoon.

These may be made previously, but must be heated five or six minutes before sending to table.

— Tomatoes for all Tastes. —

Tomato Soup. — Stew 1 pint tomatoes 20 minutes. Boil 1 pint milk and thicken it with 2 tablespoons of flour, rubbed smooth, in 2 tablespoons butter. Strain the tomatoes, and stir into them ½ teaspoon soda. Add the boiling milk and serve immediately.

Baked Tomatoes.—Remove the core from smooth, perfect tomatoes, and take out some of the seeds. Sprinkle the hollow with fine breadcrumbs, season with salt and pepper, and add a generous bit of butter. Place in a pan, and bake very slowly until tender but not broken. Serve at once.

Stewed Tomatoes. — Put 1 tablespoon butter in a granite saucepan, and brown a thinly sliced onion in it. Add 1 quart peeled and sliced tomatoes, season with salt, and pepper, add a bay leaf, and simmer gently one hour. Cooked in this way they are much superior to the usual stewed tomatoes.

Tomatoes Stuffed with Beef.—Prepare the tomatoes as in above recipe. Mince 1 onion very fine, add ½ cup fine breadcrumbs, ½ cup chopped roast beef, season to taste, and 2 tablespoons melted butter. Sprinkle buttered crumbs thickly over the top, and place in a baking-pan. Bake half an hour in a moderate oven. Nice for breakfast or lunch.

Tomatoes with Corn.—Stew together for 10 minutes 2 cups cooked tomatoes and 2 cups cooked corn cut from the cob. Season with salt and pepper. Add 1 tablespoon butter and serve at once.

Tomato.—Melt 3 tablespoons butter in a frying-pan, and add 6 large tomatoes which have been skinned and sliced. Let cook until tender, then stir in 6 wellbeaten eggs. Stir constantly and season to taste. As soon as the eggs begin to set serve.

Scalloped Tomatoes.—Select ripe tomatoes, skin, and slice them rather thick. Mix fine breadcrumbs, ½ teaspoon salt and ½ teaspoon pepper, with ½ cup melted butter. Fill a buttered baking dish with alternate layers of the crumbs, and sliced tomatoes, having the first and last layers of the crumbs. Bake one hour.

People Finding Fault.

Unfortunately a great many people are addicted to fault finding. Nothing causes more unhappiness in a family than continual nagging. There is no sense in it, it does no good, and it always makes for mischief. Fault finding turns more children away from home than anything else. Some men are liked better out of sight just for this reason. Their room is preferred to their company.

Usually fault finding is confined to the little things—things that should be passed over lightly. The big things are taken philosophically enough, talked over, and remedied or borne with as seems best. But the little petty things are talked over and over, each one thinking that the other should give in. The habit grows. It has sent many a woman to an early grave, wrecked many a man's usefulness, and scattered families that otherwise would have lived happily in the farm home.—The Furrow.

Scalds and Burns.

Half an ounce of ordinary baking soda—that is, of bicarbonate of soda—dissolved in a pint of camphor water, makes a most soothing application for burns and scalds. Linen rags may be soaked in it, and then applied over the injured parts for a day or two. After that, the ordinary ointment of boracic acid, spread on linen, should be used. The blisters that form should only be pricked with a clean needle, and the fluid that escapes should be carefully washed away.

To Cure Blackheads.

Bathe the face with hot water, then rub a good toilet soap and a little powdered borax into the pores with a sponge or soft flannel, rinsing in warm, then in cold, water. Once a fortnight or three weeks should be often enough for this treatment

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. ...gn, 6/.

...DRESS—85, Currie St., Adelaide. ...one, 1234.

Open Border Notes.

The most satisfactory part of the year to the amateur gardener in the warmer parts of the State is the late winter and spring months, during that period the garden hose and its almost perpetual use—is at rest, and one has time for the pleasanter parts of gardening.

Therefore, all opportunities must be seized to beautify and prolong this period as much as possible. For this reason the seed-boxes and pans should be now ready to receive sowings of annuals and perennials.

If put in now and carefully tended by regular watering and pricking out into pots when large enough, they will be fit to plant out in position when the first autumn rains come and will bloom a few weeks later, and by this means you can get four or five months of bloom before the hot winds of spring come along to make your spirit weary.

If annuals are to be grown only a select number of kinds should be raised, taking care of course that the sorts selected are of the very best for all purposes. Sow nothing but the very best seed procurable. Inferior plants give just as much work and trouble as the better kinds, but what a difference in the result.

What is wanted in a garden is a collection of plants whose bloom will last well, growing, or in water for house decoration. There are a large number very beautiful in themselves but whose blooming season is so short that it is not worth while cultivating them.

Keep all lawns well mown and watered, because it is now when all the surroundings are dry that the greensward can be fully appreciated. Every small garden where water is plentiful should have a few square yards of lawn, on which many a pleasant hour may be passed in the cool of the evening after a hot day.

Keep all climbing plants tied up securely, but always avoid if possible interlacing the stems in trellis or iron work which may require painting.

Hedges should be clipped carefully and layers made of shrubs difficult to root by cuttings. This is simply done by bending a low branch down and pegging the elbow down below the surface, covering the same with sand. At the same time cutting a notch on the underneath surface will often facilitate the formation of callus. Carnations can also be layered freely now by the above method, while verbenas will root almost immediately if the horizontal stems be covered with good sharp sand.

Anyone who observes the brightness which a few plants of agapanthus both blue and white varieties, lend to a border should not fail to secure a few bulbs in the coming winter.

Dig up roughly all unused beds and allow them to remain. It is better to apply manure later on prior to replanting.

As any flower-heads on zinnias, carnations, globe amaranthus, calliopsis, pelargoniums, and numerous other border plants become unsightly cut them away carefully, always taking care to prune the old stalks back to to a growing bud, to induce a fresh output of growth and blooms. Specially fine blooms which have been previously marked could be saved for seeds. It will be found necessary to protect sunflower seed heads from the sparrows by placing them in gauze bags.

Verbenas, petunias, phloxes, and zonale pelargoniums may be cut back when in a somewhat thin condition, and the soil between stirred with a fork; then apply a fresh mulch of good rotten stable manure, upon which good liberal supplies of water can be applied at once. The effect generally is a return to a gay appearance in a few weeks.

Carpet and ribbon designs to be kept in good order require much attention in the direction of pinching out straggling shoots. Alternantheras, iresines, plectranthus, variegated mesembrianthemum, gold and bronze and bicolor pelargoniums make a lovely display in our climate when utilised for this purpose, and may be propagated by any amateur in a simple calico-shaded pit.

Keep gladiolus, tuberoses, dahlias and perennial phloxes well staked and watered.

Roses may still be budded if proper precautions are taken to induce a ready flow of sap.

Carnations must be staked where they are exposed to the force of the wind, and all decayed blooms (not carrying seeds) should be removed. This last remark might well apply to all kinds of flowers, for a flower garden, to be effective and pleasing, it must be kept tidy.

In ribbon borders all flower stems would be better removed from echeverias and pyrethrum (or golden feather). The open spaces in the shrubberies should be loosely forked or dug, but do not flatten the surface down with a rake.

Dahlias, tuberoses, bouvardias, and gladiolus (of successional planting) should be in bloom, and require plenty of water.

Lawns should be well watered, mown regularly, and swept cleanly. An effort should be made to fill blanks in couch and buffalo plots which have missed, and the garden paths should be kept clean and evenly swept or rolled, according to the material used in construction.

It is almost needless to say that watering must still be attended to, and with the greatest care. Where small trenches are opened they should, after the ground has been soaked, be carefully filled in, and the surface of the beds should always be gently stirred, so as to prevent caking. It will always be found that the greatest satisfaction is obtained by giving the ground a thorough soaking, say, once a week, or oftener, according to the state of the weather.

(Continued on page 436).

Why Have Bare Walls.

What appeals more to the lover of beauty, when passing through a village, than the sight of a rustic cottage with its bare, and, perhaps, patched walls, hidden beneath a wealth of foliage reaching even to the chimney stack, or clinging with persistency to the tile covered roof? The verandah decked with roses in bloom, and every inch of wall space covered with trimmed ivy, will linger long in the memory of those who have witnessed such a scene, and the beauty of those exteriors is more intensified by reason of its natural wildness unassociated with rigid rules of decoration (writes an English paper).

Climbers are plentiful, and suit the pockets of the poorest. For a few shillings the most fascinating of cultivated clingers may be obtained from a reliable nurseryman; while the commonest may be had for the trouble of searching.

We must, of course, first take into account the aspect and the nature of the soil. While some climbers will flourish on any wall, even doing well when facing the sunless north, the plants should be suitable to their surroundings. Room is essential to the welfare of any member of the vegetable world, and food must be adequate also. It is really wonderful though how some of them thrive when no special preparation of the bed has been made. We have in our minds a Wisteria planted several years ago on an eastern wall, when merely a couple of spadefuls of earth were displaced to receive the roots; and no climber has done better. Evidently the locality suits the variety, and the climber, by its healthy appearance, is well satisfied with its environments.

The careful preparation of the bed, nevertheless, has much to do with the success of climbers, and if the subsoil is well broken up and good, rich soil transported—the lighter the better for the tender varieties—the plant has a very fair chance of extending its roots, and finding food to make vigorous growth.

Some people have an idea that ivies encourage damp. This is quite a mistaken notion, for the leaves, pointing downwards, carry off the rain and prevent it penetrating even to the stem as it clings in a friendly way to the wall. There are many varieties of ivy to be met with, from the King, with its broad, glossy, heart-shaped leaves and stout stems, to the small variegated kinds to be met with in the copse. The Irish variety is, perhaps, the one we should select for rapid growth. It clings fairly well, and every year the young shoots push themselves rapidly up the wall and soon hide all bare spots. The small-leaved kinds do well for rockeries, and the shoots, working as well in a downward direction as in the opposite, are admirable for covering clumps. The advantage of ivy is that it is always green, and does as well if inserted in a northern border as if planted in any other aspect, providing it is well watered and the soil is of a sandy loam. The fully-rooted plants should be pegged down to the surface, and they will soon begin to shoot. Cuttings of 10 or 12 inches in length will strike with readiness, but roots should be obtained—and they can be at little cost—if possible. In the spring straggling shoots should be trained, and, beyond careful pruning, the climber will want little attention. In less than two seasons we in this way, entirely covered up an old wall nearly 10 feet high where other plants failed to thrive.

The Wisteria, as we have already mentioned, does well as a climber. The ivy bears flowers in the winter when other plants are resting, and its umbel-like clusters of berries are all the more welcome then, though somewhat inconspicuous; but the lilac and mauve racemes of the Wisteria in spring, when the leaves are beginning to unfold themselves, are, indeed, lovely to behold. This elegant climber is, perhaps, capable of covering more ground than any other. Every autumn the long, spear-like shoots have to be removed if the side shoots are to be encouraged and wall surface covered, or they will soon entwine themselves round any object within reach, and especially branches of the same plant. The disadvantage of the Wisteria is its weight. Unless it is securely fastened, the autumn gales, assisted by the mass of foliage, work havoc in a short time, and on some fine morning you look out to find that the damage is great, if not irreparable. The Wisteria likes a sandy loam or peaty soil, and may be propagated by layers of long, ripened shoots.

The Virginian creeper is still very popular, and, certainly, in autumn, when its leaves are changing, first from green to varied purplish tints till, finally, its fiery red colour cannot fail to attract the passer-by, it is very beautiful. But the larger variety, the Hederacea, is coarse and by no means self-clinging. It hangs in summer time in lovely festoons, but grows unwieldy and troublesome. In the course of three summers we covered the front of a stuccoed house opposite at least 30 ft. in height, but it is beyond control now. In a great many places it has been succeeded by the self-clinging variety brought to this country from Japan between 40 and 50 years since, and known as the Ampelopsis Veitchii. Its growth is not so rapid, but, when once established, it can be trained in any direction, and it entirely clothes the structure it clings to. By means of the "feet" attached to the stems, the grip is so secure that the strongest gales fail to have any effect on it. The small leaves have such short petioles, or stalks, that the stems are entirely hidden. It is perfectly hardy, and can be easily transported. Some three winters ago we noticed that in the struggle for existence an ivy was endeavouring to smother a specimen of the small-leaved Ampelopsis, so, with ordinary care, the latter was removed and re-planted elsewhere af-

ter the stems had been pruned; and on a western wall it is now in its beauty, and its autumnal hues are superb.

The old-fashioned white jasmine, or jessamine, is still a favourite with most people, but its place has partly been taken by the Chinese variety, which blooms profusely in the winter, showing a profusion of bright yellow flowers.

The honeysuckles are too well known to need any special mention; they grow freely and cover trellis work, and on summer evenings the scent is delicious.

For training over arches and arbours the popular climber to-day is the Crimson Rambler, a descendant of the hedge rose, which grows rapidly, and freely scrambles over poles. It needs little, if any, pruning, and the clusters of bright crimson flowers make a grand show.—A Country Resident in the "Rural World."

Ferns.

In order to grow ferns successfully under local conditions a permanent water supply, plenty of soil of a peaty and loose loamy character, old timber and masonry, and a site where the light may be kept entirely under control are the first necessities.

The fern family is so large that no one site, soil, or general set of conditions will serve for all; but, speaking generally, they are shade loving plants, and, what is more, they rarely look well except in the shade. Another necessity is a moist atmosphere, and this is forthcoming at all seasons only where the fernery is arranged under the arms of high spreading trees, or roofed in with lattice, canvas or rough timber, carrying climbing plants. Strong winds, either hot or cold, should always be guarded against. The clearest examples of the ordinary wants of hardy ferns exist in our well watered and deeply shaded gullies. Anyone making a fernery may have many exotic kinds of great beauty, but a study must be made of the native home and requirements of each before favourable and effective sites may be found for all. Some parts of the fernery should have soil of the character of ooze—this for ferns which like sour and water-logged material. Others will thrive best on such food as is contained in old mortar and the refuse of coarse mosses, which have decomposed and sweetened. A great deal of sharp sand and coarse, clean peat blended, with water constantly running through it, or held in a vaporous condition, affords a favourite growing medium to many ferns. Decayed timber, especially such as can be brought from the depths of the wood or forest, contains all that many ferns require, whilst ordinary loam, such as may be dug from any old pasture land, is suitable for such ferns as are usually potted and employed for house decoration.

Old cow dung, decayed leaves, rotten wood, peat, silver sand, fibrous loam, charcoal, the black stringy ooze from swamps and marshes, old mortar and rocks of a soft and porous character, are the materials to be sought and properly blended where one desires ferns in variety. A fernery—in or outside—should be a close imitation of nature, or it is not likely to prove of lasting interest. The levels will of necessity vary, and hence more or less exposed, wet and dry, warm and cold, well lighted and shaded parts will exist. To make a success of a fernery from the start, the surest way is to get in plenty of material, so as to ensure a permanently damp body of earth, and a damp air pervading its surface. It must never be forgotten that ferns cannot stand a dry air. In this brief space we have been able to set out no more than the essentials. The seasons for potting, dividing of roots, thinning out, spacing, and, above all, hand watering, must be carefully studied, and it is advisable to begin with hardy local kinds, adding new and more expensive varieties as experience warrants.—"Rural World."

Arches and Covered Ways.

(From "The Garden").

Than well-covered arches and covered ways there are few things that give more satisfaction and interest in the garden, while their value is twofold, helping as they do to relieve the flatness of the garden, as well as providing a cool and shady walk, also many things may be grown in this way that would not otherwise find a place owing to want of space.

Arches may, of course, be covered with a variety of useful and delightful subjects, according to the means and tastes of the planter. They may be constructed of either wood or iron. Rustic wood arches have an excelent effect, but care must, however, be taken that they are not made too heavy, or the principle object (i.e., a light and prettily covered walk) will be defeated. The main posts must be stout, and to minimise rot the ends should be well tarred or pitched, and allowed to get thoroughly dry before putting them in the ground.

Iron arches are more durable while being lighter in build, but plants do not seem to take so kindly to them at first as they do to wood. There is, however, no great difficulty about this, as they will eventually get accustomed to their supports.

In all cases arches should have their feet firmly bedded in the soil; for with the plants they have to suport they offer a considerable surface to the wind. The height of the arch when fixed should be from seven to eight feet.

(Continued from page 433).

As long as the hot weather lasts the fern-house will be about the most delightful part of the garden. It should be kept tidy and fresh-looking by the removal of all dead and scorched fronds, and by giving all encouragement by means of water and shading to the young ones. The walls and floor must be kept moist, and the place may be syringed with pure water frequently. Many ferns are liable to attacks from mealy bug, which may be taken off with a jet of water from the hose. They are also attacked by a small, round, chocolate-covered scale, which may be destroyed by being washed off with a sponge and some softsoap and water. The frond should rest on the flat of the hand, so as not to crush it unnecessarily while it is being sponged.

Preparations will have to be made for the planting of bulbs such as Freesias, Ranunculus, Anemones, Hyacinths, Narcissus, Montbretias, Lachenalias, Watsoni. Tulips and other spring bulbs. All the above are better in plots rather than mixed in borders unless the grower does not mind the loss of ground they take up till the foliage has died off.

Dahlias on the plains require plenty of feeding with liquid manure if for show be grown, allow plenty of disbudding must be done; but should a rather coarse kind in the Cactus or Show be grown allow plenty of buds and the blooms will be more refined.

Lawns can still be forced with dressings and water. They should be cut with machine or scythe regularly, and the edges kept trimmed with sheep shears or the edging iron—a very useful tool.

Cannas should have all the old flower shoots cut out, and plenty of water in hot weather. Delphiniums require similar treatment.

Carnations especially of the decorative kind can be forced into bloom for the winter months by using cow manure liquid. A lot of work is required in tying up, the thinning of weak shoots, and in disbudding. It is rather early for the striking of cuttings, but if a shadehouse is handy or a six-foot wall, cuttings may be dibbled in prepared sandy loam, and firmly pressed after the soil has been soaked. Use for the topping up half an inch of sharp sand—this may be put on dry over the wet soil, and as the hole is made the sand runs down to the bottom and the cutting comes into contact with it assisting the cuttings to strike more readily. Layering can still be done.

Trenching of ground ought to be done this month and where the soil is heavy or a clayey nature it is very necessary. If done in wet weather the soil when it does dry is liable to set as hard as bricks. Ashes or small charcoal is good in very retentive soils to keep them open. A good dressing of spent hops is beneficial, if spread on each spit or layer till the bottom of trench is reached, this should be roughly broken up with a pick. Always keep the clay, at the bottom.

Roses are amongst the few plants which like the mild summer, and where plenty of water has been given they are now breaking into bud. Of course, if they could have been kept back a few weeks much better results in the way of size and color would have been attained. When a shoot has its flowers spent, cut back and another crop will come before the winter. We know that growers who exhibit do not advise this plan as it is too much of a drain on the plant, but where plenty of ordinary bloom is wanted with a short life and a merry one, it is a good plan. Liquid manure will aid the plants to throw better blooms.

Chrysanthemums should have all surplus buds taken early in the month, be tied up in position, and manure given once a week. All side shoots are to be kept off, also suckers. Syringing the foliage is a benefit in the evening. Carculio beetles are fond of the buds and foliage so they must be carefully sought after. Pot plants must be trained into shape, and disbudded, manured, and where required given a final shift into larger pots.

Prepare a good lot of sandy loam and leaf mould to be used in covering seeds to be sown shortly. It is always advisable to mix this up when the weather is dry, as the soil runs through the sieve, better than when wet. You can make two grades —fine for small seeds and medium for large. When prepared place under cover in case of rain. The above also applies to potting soil.

If seeds are to be sown in boxes, a good plan is to place some rough straw manure in bottom of box, then cover this over with rough garden soil up to two inches of top. Give a good watering and put an inch of sandy loam on this and press level ready for the seeds. Small beds can be treated in the same way.

Small sowings of the following may be put in:—Erysinnum, Chrysanthemum, Poppies, Lobelias, Mimulus, Rhodanthe, Sweet Peas, Candytuft, Senecio, Cornflower, Schizanthus, Calliopsis, Brachycome, Trachymene, Wallflower (annual), Nemesia, Petunias (for warm borders in spring), Pyreetrum (Golden feather) Lupins, Linum, Acroclinium, etc. A larger batch can be sown in April which is the best month to sow seeds of spring flowers.

Any pansies ready should be pricked off into good loam, where the the sun has not too much play. Aguilegias, Sweet Williams, Primroses, Foxgloves, Antirrhinums, Penstemons, Pyrethrum roseum, Polyanthus, and other perennial seedlings may be treated in the same way.

Geraniums can be struck and plant out those rooted.

Make a clean sweep of old rubbish to prevent any vermin from harboring.

Still cut edgings and hedges except Pottosporum if flowers are wanted.

Save any seeds that are worth it.

The sweet smelling stock is a flower of which it would be difficult to have more than enough. Those who have not already plenty of seedlings on hand will be wise to make liberal sowings without delay. Almond Blosson, Princess Alice, Queen Alexander Vesuvius, are all excellent varieties. In Blush are all excellent varieties. In pansies, the earlier sown seed boxes should be showing a nice lot of plants, either for pricking out into nursery beds or for planting directly into the bed or border which they are to occupy. The former is the better method—as not only are the young plants more easily protected from vermin of all sorts, which on may more easily receive the shading with a scrim covered frame, which on very great benefit to the young plants. very great benefit to the young plants. Cinerarias rekuire the same treatment. Nimesias are going to be popular this season, a packet or two of seed, will repay the grower. Sutton's hibrids are probably the best of the class. Growers of sweet peas, will soon be busy, making preparation for sowing. Deep digging with a liberal addition of well rotted manure will secure big results. Where growers have been

troubled with "streak," they may be interested to know that the conclusion arrived at by experimental work in England is that it is due to fungus growths in the soil; and the treatment recommended is the saturation of the area of soil to be planted with a weak solution of formalin, lysol or similar preparation, one in five hundred of the former is said to be sufficient. The bed treated should be covered with bagg ng for six hours after saturation and should of course be thoroughly worked before the seed is sown. If troubled with mice, or the too earnest attention of the sparrow—coating the seed with red lead before sowing will be found a protection. Winter flowering peas may be sown at once in open sunny positions.

The end of this month and the beginning of next is probably the best time for putting in the majority of spring flowing bulbs, the more hardy varieties appear to be very indifferent as to soil. It is wonderful how they thrive under what appear most unfavorable conditions—we have in mind a clump of polyanthus Narcissus growing under a corkelm in a gravel yard; year after year the clump puts up its flowers, which are as fine, or finer than any in the garden. We do not of course mean to say that hyacinths or tulips would respond to such a method of no treatment, and in spite of the instance we have quoted, there is no question, but that deep digging, very old manure or a few handfulls of bonedust are beneficial to this class of plant. If the soil is at all stiff the bulbs should be planted on and covered with good clean sand, which not only keeps the bulbs sound and increases reproduction by off sets, but leads to bigger and finer blooms.

Hydrangeas.

The Hydrangea ranks as one of our most useful plants, as in addition to being showy when in bloom, they are easily raised and managed, and can be flowered successfully either in large or small pots. Although large specimen plants are very handsome when in bloom, plants grown in small pots and having one good head of flowers are general favorites.

To obtain and maintain a supply of small plants, grown on the single stem system to produce one head to bloom, annual propagation must be resorted to, and cuttigs will strike almost any time during the growing season. Sturdy, healthy growth that has not flowered should be selected for cuttings, and be prepared either by removing a few of the lower leaves and cutting the stem across below a joint, this method being advisable when the growth is rather long, or by taking the cuttings with a heel or portion of the old wood attached at the base, short shoots being preferably prepared in this manner.

No plant resents interference with the roots more than the Hydrangea, and for this reason it is better to insert the cuttings singly in small pots than several in a large pot, root disturbance and breakage being avoided thereby. Light sandy compost, consisting of equal parts loam and leaf mould, and half a part sand, should be used and the cuttings be firmly pressed in.

One of the best places to strike Hydrangea cuttings is under a handlight in a position that is somewhat sheltered from the sun, but yet quite open. After the cuttings are inserted they should be given a good watering through a fine-rosed watering can, and the pots plunged up to the rims and the handlight be placed over. The cuttings will require shading from bright sunshine, and should occasionally be sprinkled overhead with water to prevent the soil getting too dry, and also to keep the foliage fresh.

When the cuttings are well rooted, they should be potted into 4½-inch pots, compost as before, with the addition of half a part of thoroughly decayed manure being suitable. Hydrangeas are moisture loving subjects, but at the same time the young newly-potted plants must not be watered too freely until the roots have obtained a firm hold on the fresh compost and are growing nicely. Abundant supplies of weak liquid manure should be given when the pots become filled with roots and on the approach of flowering time. Greenfly is the only pest that troubles Hydrangeas to any extent, the remedy for these insects being fumigation. Small plants after blooming can, if desired, be grown on into large specimens, the flowering stem being removed and the plants potted on into larger sizes as required.

The Scarlet Pompon Lily.

(Lilium pomponium).

The Scarlet Pompon Lily is a native of Italy, and proves of easy cultivation in any garden border where some preparation has been given to the soil by the addition of leaf mould for the sake of the moisture which such a soil affords. The reason for this is that peat or leaf mould does not get compacted like a clayey soil, and therefore retains the moisture longer, even in hot, dry summer weather. In addition to this it is well to have the soil somewhat shaded by shrubs or other plants. Any class of plant will answer this purpose providing the ground is shaded and sheltered, while the Lily is making its growth. It follows, therefore, that it could be grown in a herbaceous border, provided it is planted between fairly tall growing subjects that would answer the same purpose. Some people allow the shrubs to make too much growth so that in the course of a year or two the Lilies are really smothered for want of light and air. An endeavour should always be made, however, to leave plenty of open space that the plant shall have plenty of light, even although it may not get direct sunshine, during the period the stems are lengthening and the foliage being developed. The plant grows about 2½ feet in height, and the stems are clothed with a dense array of narrow leaves for some distance above the middle. The rest of the stem is relatively bare, and each branch and flower stalk is terminated by one of its beautifully modelled bright scarlet flowers.

Prospective Purchaser — "You say this is a healthy place, yet the man next door is confined to his bed. How do you account for that?" House Agent—"Oh, he's a doctor and is slowly dying of starvation."

A Winter Cold Frame.

Lacking the facilities of a greenhouse, we may still get many very gratifying results from an ordinary cold frame. Of course, any desired size may be made; but five feet six inches by twelve feet outside measurement is convenient. However, be governed in this by the size of your hot-bed sash, if you have them. If not, then endeavour to get some, for surely once having them we could hardly do without them afterwards. Select a warm, sunny spot, if possible, Drainage should also be ample, as standing water or occasional flooding would be harmful. Excavate two feet in depth the length extending east and west. Set in posts of 2 in. by 4 in stuff 3 ft. in height for back and two feet six inches for front side. If the frame is to be the same size as referred to above, there should be four posts to each side, enough in any case to make it substantial. Excavate large enough so that outside measurement of frame shall not include the posts. It is preferable to have the posts on the outside rather than inside, as in the latter case they are always in the way. This, of course, makes vacant space between the bank and lining, which must be well filled in with soil. It is more work to build in this way, but it pays in the end, for if well constructed, the frame will last for many years. The lining should extend from the bottom of pit clear to the top of posts. The tops of the posts should be sawed slanting to give the proper slope when the frame is completed. The complete frame will be two feet six inches on the top by three feet on the lower side, which gives ample slope for water-shed in winter, as also for hot bed in spring. Thoroughly banked up with manure and securely covered with boards or hot bed sash, this will make a very convenient and serviceable cold frame as long as desired, and may then be easily converted into a hot bed for late winter and early spring work.—Exchange.

The Mealy Bug.

The mealy-bugs, of which there are several species, belong to the family Coccididæ, or scale-insects; but, although belonging to the family, they do not form a scale, and are not stationary.

This insect is common in glass-houses almost throughout the world, and in warmer portions of the globe frequently causes extensive damage out of doors as well.

The common name "mealy-bug" is given because the insects are more or less covered with a yellowish-white mealy-looking powder, which they throw out from their bodies; the object being principally to provide protection from enemies, but it also serves to conceal the eggs. There is also frequently a considerable amount of cottony material present, and this has sometimes caused the uninitiated to mistake the common mealy-bug for the cottony cushion-scale.

The mealy-bug when full grown is about ⅛ in. long, white tinged with yellow, and with a brown band on the neck. The margins of the body are armed with a number of spines, and there are two long cottony threads extending backward from the last segment of the abdomen.

Mealy-bugs are dreaded on account of the enormous rate at which they multiply, a single female laying several hundred eggs a day. It will thus be seen that the quantity of sap extracted from the tissues of plants, if these insects are allowed to go unchecked, must be enormous, and will surely result in serious injury, if not ruin, to those plants.

Treatment, &c.—Mealy-bugs are amongst the oldest and best known of the gardeners' enemies, at any rate under glass; and yet the means of fighting them have till comparatively recently been imperfect, and indeed there is still much to be done before these small creatures cease to be a source of anxiety. The following methods of dealing with the pest have all been tried, and under certain conditions are all useful:—

1. Where the plants attacked will stand it, and the appliances are at hand, direct forcible streams of water against them, so that they may be dislodged. If this practice is persisted in it will prove very effectual.

2. Alcohol applied with small scent-spray has proved very useful indoors.

3. Kerosene emulsion is perhaps the most generally available insecticide.

4. Hydrocyanic-acid gas has been used successfully, both indoors and outside. The mealy-bug does not appear to have many natural enemies one of the ladybirds being the most destructive.

Fruit Garden

The Influence of Manures on the Quality of Fruit.

(By H. M. Will, B.Sc., London.)

Very little exact experimental work has been done in this country regarding the influence of manures on the fruit-bearing capacities of trees, and on the size and quality of the fruit thereby produced.

The Englishman is perhaps in too great a hurry to see the results of his efforts in this direction, and feels that he cannot afford to wait the two or three years before the results of manuring become apparent.

In other countries, however, and even in a comparatively new country like Australia, the force of this has been clearly brought forward by experimental work on the subject.

Of the effect of the three important fertilising ingredients, nitrogen, phosphate, and potash, the following has been found to be the general result:—

Nitrogen has a very small influence on the quality, except that, with excess, the fruit becomes watery, and with a deficient supply of this ingredient is small and insipid in taste. If too much nitrogen be applied, the fruit ripens badly and tends to fall off before being mature.

From the lack of phosphates, the fruit remains sour and harsh to the taste.

Potash has, perhaps, more influence than any other manurial ingredient upon quality generally, i.e., size, color, crispness, and taste. The result of potash manuring is the production of more table fruit, which should be the desire of all growers.

Very interesting samples on this point were shown at the recent Royal International Horticultural Exhibition, at the Chelsea Park, London. The fruit—apples and pears—had been forwarded all the way from the fruit farm of Mr. R. E. Warren, "Glenthorpe Orchard," Harcourt, Victoria, Australia, and arrived in splendid condition in London. The main idea of the experiment there had been to test the effect of the various manures upon the quantity and quality of the produce.

The samples were from a six-plot experiment, but fruit from three plots only had been forwarded.

The yields from all plots have already been reported in the "Garden and Field."

Mr. Warren was very anxious to have the fruit tested as regards its quality, after having been under cold storage for such a considerable period, and this was arranged. Amongst others who tested the fruit were Mr. Malthouse, horticultural lecturer in the Harper Adams College; Mr. Sharp, horticultural expert to the Wiltshire County Council; Mr. Green, editor of the "Scottish Gardener," and the manager of the Woburn Experiment Fruit Farm, all of whom testified to the superior quality as regards appearance, crispness, flavor, and quality generally of the completely manured fruit compared with either of the other lots.

The pears, which were splendid "stewers," but rather tough in their raw state, were "beauties," several from the manured plot weighing over two pounds each.

In this experiment only two lots were exhibited, the completely manured lot weighing exactly three times the weight of the unmanured lot.

To anyone interested in this matter Mr. Warren, who is an enthusiastic colonial fruitgrower, and a son of a well-known fruit growing expert, Mr. J. R. Warren, F.R.H.S., will be pleased to give further details of his experiments.

When purchasing jams, preserves etc., housewives will do well to carefully note that the articles offered them bear the label of the Unley Park Preserved Fruits and Jams Factory, of which Mr. Charles Terry is the popular and energetic proprietor. By insisting on taking goods so branded they can rely on securing excellent value as regards both price and quality. The extensive factory situated at Unley Park is fitted up with the latest machinery and appliances for the manufacture of all kinds of jams, as well as a varied selection of preserves. As Mr. Terry only purchases sound and suitable fruit, buyers may absolutely rely on securing the very best quality of jam and preserves on the market. Mr. Terry invites the fruit growing fraternity to call on him, with a view of securing particulars, etc., of the liberal terms upon which he is prepared to buy their fruit.

All About the Ivy.

The Ivy is probably better known to most beginners in gardening matters than almost any other subject, and yet comparatively little may be understood regarding the method of dealing with the plants and the wealth of mater al available in the many varieties, says a writer in the "Garden" from which we have adapted the following paragraphs The Ivy is known to botanists by the name of Hedera, and is a popular genus of evergreen shrubby or climbing plants; it belongs to the Aralia family (Araliaceae).

The number of evergreen climbing plants is not large, and for this reason the Ivy has an especial value. No other subject will compare with it for covering bare walls or fences and many other unsightly erections. The small-leaved Ivies, of which there are many varieties, are very useful for growing among rockwork; and they are also especially well adapted for training over the roots of large trees. These small-leaved varieties look very pretty and harmonise satisfactorily with Ferns and similar subjects.

Ivy as an edging should be more frequently used. Contrasted with the glorious colours of masses of gay flowers in the summer season the preferred to the many artificial crea- effect is beautiful and much to be tions, such as tiles, frequently used for the same purpose. A live margin of Ivy some 12 inches to 2 feet in width may be made into a dense fringe if the plants are properly treated. They should be arranged in rows, and the growths pegged down in one direction only as soon as planted. To keep the growths from getting overgrown and uncontrolled, the young shoots should be pinched or cut back two or three times, according to the vigour of the plants, such borders have the objection of forming harbours for pests and it is a very serious one.

In addition to the evergreen climbing Ivies, there are varieties of the Tree Ivies that are little known. The Tree Ivies are known to the botanists by the name of Hedera arborescens, and are of a non-climbing habit. If the plants are to reta n their bushy and compact form, they must be grown continuously in pots. The soil for these Tree Ivies should comprise two parts of loam, one part of leaf-mould or decayed manure, and coarse sand in sufficient quantity to make the compost porous.

With respect to the planting of the evergreen climbing Ivies, the numerous forms of which have originated from the one species, Hedera Helix, a native plant of Britain and other parts of Europe, objection is sometimes taken to the growth of this subject on the walls of dwellings, on the alleged ground that it makes them damp and for other reasons. A moment's reflection will refute such an idea. As a matter of fact it has just the opposite effect. Moisture is drawn off by the aerial rootlets which adhere to the wall, and the leaves throw off the rain. When planting it is important to remember that the Ivy does not take kindly to cemented walls, and unless special measures can be adopted to erect a trellis or something of this kind, it may be courting failure to plant in such positions.

Where it is intended to plant Ivy against walls, the ground should be trenched fully 2 ft. to 3 ft. square, working in a plentiful supply of well-rotted manure, and if a quantity of old mortar rubbish can be incorporated so much the better, as Ivy revels in soil of a limy nature. It is well-to remember, however, that rich soil causes the variegation to lose much of its beauty and the leaves ultimately to assume a green colour. For this reason plant the variegated sorts in poor soil.

The various forms of the climbing Ivies may be propagated by cuttings. those made from firm shoots 8 inches to a foot in length answering very well. The cuttings should then be inserted in ordinary sandy soil, half their length, in small trenches of sufficient depth, and the soil made firm at their base before levelling off and finishing the operation. By these means plants may be raised with the greatest ease.

Good sorts to grow, says the same authority, are Hedera Hel x canariensis (the Irish Ivy), a very reliable variety, suitable for covering fences, walls and bare, unsightly places: H. difitata, dark green, varied with white, equally good for walls, etc.; H. dentata; H. purpurea, purplish.

Propagating by Cuttings.

Nearly all perennials grown in our gardens can be readily propagated by means of cuttings, and as it is advisable to renew many of the specimens (such as carnations, penstemons, geraniums and pelargoniums, roses, fuchsias, camellias, hydrangeas, Bouvardias, pansies, chrysanthemums) every two or three years, a few words on the subject will not be out of place. A cutting is a part of a plant capable, under favorable circumstances of soil, moisture, and temperature, of throwing out roots and becoming a distinct plant similar to its parent. The cutting sometimes consists of (1) a young shoot, (2) others strike better from a piece of ripened wood (3), some from a leaf with a bud at its base of the parent plant (5), while there are some that strike best from a cutting taken from the roots.

Most of the quick-growing, soft-wooded plants, such as the antirrhinum or snapdragon, shrubby calceolarias, carnations, chrysanthemums, wallflowers, gaillardias, penstemons, salvias, pelargoniums, petunias, fuchsias, verbenas, and double stocks, are best propagated by the young shoots or tops of the plants.

Camellia, roses, and most kinds of hardy evergreen shrubs by cuttings of partially ripened wood.

Cinerarias, and nearly all of the herbaceous perennials can be increased by cuttings of offshoots from base of old plants.

In all hollow-stemmed plants it is essential that the cut must be made through a node or joint. This cutting through at a joint is also of importance in other cases and is the reason why taking the little shrubby side-shoots as cuttings is often so successful, for what is technically called the heel—the point of junction between the elder branch and the young shoot—is well supplied with incipient buds, from which roots are readily produced. It is also of importance that the cutting should be taken off with a sharp, clean knife.

— Soil required. —

Except for particular cases nothing is better than silver sand placed over a layer of the particular soil the plants delight in, and beneath the again good drainage. In most cases half an inch of sand and three-quarters of an inch of sandy loam will be found sufficient, and the nearer the cuttings are placed to the side of the pot the quicker will they send out roots.

Hoeing.

— Its Value to Growing Plants. —

What is the real use of the hoe? Simply this: To aerate and sweeten the soil; and as this practice is undoubtedly the main feature of healthy and robust growth of crops, let us appreciate the same to the fullest extent. The hoe should be regularly brought into use during spring and summer whenever the ground becomes caked or soddened by excessive heat or rain, to allow the free admittance of air to the roots and also to conserve the moisture beneath the surface. This is easily done by breaking up the soil to the depth of two or three inches to form a coating of fine soil all over the ground. Land treated in this manner is always kept in an open friable condition, whereby the welcome showers of summer are readily soaked up and conveyed to the roots instead of running away, as it would do, on hard-baked land. As the chemical elements are made soluble by air and moisture, it directly indicates the necessity of aerating the soil. If the hoe is used two or three times a week on a certain strip of ground and another untouched, the striking luxuriance and superiority of growth and productiveness of the crops grown on the former patch will readily be observed. The trouble of keeping down weeds is at once arrested by this regular practice of hoeing, and where they have become at all prominent, hoe down with a sharp tool and allow them to wither on the surface to form humus, of which good ground is largely composed. Hoe regularly, avoid weeds, have good crops and a respectable garden.

Sponging House Plants.

Sponging is done for two reasons, both equally important. First, to cleanse the foliage from all dust and encrusted dirt, chiefly that of soot, dust and the excrement of insects combined; secondly, to rid the plants of injurious insects. The encrusted substance clogs the pores of the leaves, thus seriously impairing the general health of the plant; and the insects suck the very life out of their host.

From the time that the leaves are moistened with clear water, or insecticide, till they are dry again the plants should be shaded from bright sunshine. Sponging should be done with tepid water only. If dust or encrusted dirt only be present, the leaves must be syringed first. This will soften the hard substance on the leaves, and it can subsequently be removed with the aid of the sponge more readily; but if insects are present, attack them direct with the insecticide. Do not, as it were, erect any partition between them and the solution to be applied. In all cases where insecticides are used it is advisable to syringe the plants again with clean, tepid water before exposing the leaves to the sun. Use a soft sponge, and, supporting each leaf with one hand, gently draw the moistened sponge upwards from the stalk end towards the point. To effectively remove hardened soil from the leaves draw up the sponge several times lightly rather than use undue pressure.

Fruit Drying

Fruit-drying is a process by which the excess of moisture upon which the germs of decay depend for their existence is removed by evaporation (artificial heat), or by the heat of the sun.

Properly-dried fruit retains the colour and flavour of the original article for an indefinite period if kept dry. The advantages of fruit-drying cannot be over-estimated, for by this means not only can a supply of fruit be secured for home use all the year round, but the surplus crop, for which a local market cannot always be found, may be turned into a marketable product.

— Sun-Drying. —

To secure the best results in sun-drying, a climate not subject to summer rains with a hot, dry atmosphere in the day and a dry atmosphere at night is required.

— Apples. —

Procure a machine that slices the apples, and be sure that it works evenly. Drop the apple as soon as pared, cored, and sliced into a tub containing a solution of salt and water, ½ oz. to 1 oz. (not more) of salt to the gallon of water. Allow the fruit to remain there for twenty minutes at least, stirring occasionally, or until a sufficient quantity is prepared to fill a number of trays. Take from the brine, and spread the rings in one layer on the trays, and place in the evaporator or in the sun to dry.

— Prunes and Plums. —

Dip in a solution of lye and water; 1 lb. of concentrated lye to 10 gallons water, which is kept as nearly as possible at boiling-point. Baskets of galvanised wire are used for the purpose, and a tank of heavy galvanised sheet-iron is also preferable, the basket being made to hold enough fruit to fill one tray, and to fit easily into the tank, the size of each depending upon the amount of fruit to be handled. The object of applying the lye is to remove the bloom and crack the skin so that evaporation will proceed quickly. Were this not done the skin is so dense that the moisture could not evaporate. The time for immersion varies according to variety, the state of ripeness, and the heat of the solution.

True prunes require about thirty seconds if the solution is boiling; but almost twice as long should it cool off very much, as is sometimes the case in dipping large quantities. Plums have a more tender skin; Magnum Bonum and Victoria requiring from three to five seconds only.

When sufficiently done innumerable minute cracks will appear all over the skin, care being taken not to soften the skin so much that it will rub off. After the lye-bath, rinse well in clear water—a running stream is best—so that no trace of the lye is left, then spread in one layer only on trays to dry. When dry enough place in sweat-boxes to sweat, and when that process is complete—i.e., in about five or six days—dip in boiling water to which glycerine has been added in the proportion of 1 lb. to 20 gallons of water. The dried plums should remain a sufficient length of time in the hot bath to partially cook them; after which drain and place to dry a little. In a few hours the fruit will appear pliable, plump, and glossy, and ready for packing. Silver Prunes (Coe's Golden Drop) are sulphured for twenty minutes after the lye-bath to preserve their light colour.

— Sulphuring. —

Every one will have noticed that fruit commences to change colour as soon as cut. This is caused by the oxygen of the atmosphere combining with the juices of the fruit and setting up the elements of decay. Should this be allowed to continue for any length of time it is obvious that both the colour and flavor of tthe fruit will be lost. It is therefore imperative to arrest this change as soon as possible. and with that object cut fruit are exposed to the fumes of burning sulphur for a period varying from twenty minutes to one hour, the time depending upon the amount of exposure which the fruit has been subject to after cutting, the degree of heat in evaporating, or the degree of heat and amount of moisture in the air in sun-drying. The shorter the exposure to the atmosphere and the greater the degree of heat to be employed the shorter will be the time to expose to the sulphur fumes and vice versa; also in sun-drying, if there is much moisture in the air it is advisable to sulphur for a longer period than when the air is perfectly dry. It is to be noted that as little sulphur as possible should be used, for, while no trace of sulphur is left in fruit properly sulphured, in oversulphured fruit a sharper acid than that naturally possessed by the fruit can be detected. For ordinary purposes, a fairly airtight box or packing-case, the width of the trays and a little deeper, might be used as a sulphur-box. Cleats may be nailed on either side upon which to rest the trays, and the box, with one end taken out, set on end in a convenient place. A pit should then be dug out in the earth beneath the centre of the box in which to place the sulphur-pan. The lowest tray should be about 5 in. above the sulphur-pan, in which place a few ounces of flour of sulphur, and ignite with a live coal or ember; close the door, and leave the trays of cut fruit as long as necessary, then place them in the sun or evaporator to dry. Another method of sulphuring on a larger scale is to stack the trays of cut fruit in a fairly airtight room over night, and place an iron dish or pan containing 1½ lb. of burning flour of sulphur in the centre of the room;

leave until morning, and then put out to dry.

— Trays. —

For sun-drying, trays of various sizes are made. A convenient and inexpensive tray may be made by nailing five pieces of timber, 3 ft. in length by 6 in. in width and ¼ in. in thickness, to a framework, the pices to serve as the ends, which should be 3 ft. 4 in. by 1 in by 1½ in., and the sides 3 ft. by 1 in. by 1 in. Between such trays, when stacked upon one another, there will be a clear space of ½ in. on either side from end to end, allowing free circulation of air between the trays—a great advantage in sulphuring or finishing-off fruit when almost dry.

— Sweating. —

After removing from the trays all dried fruit undergo this process, which consists simply of placing in boxes papered on the inside, in bins, or piling in quantity on the floor of the curing-room, and stirring frequently for a week or so. This is necessary because with every care it will be found that while some pieces are overdried others are not quite dry enough. The effect is to render every pieces soft and pliable and restore uniformity to the whole.

— Grading. —

All fruit should be graded before drying. When ungraded fruit is put on the trays, by the time the larger pieces are ready to take up the smaller will be so much overdried as to have lost largely in weight and value, also, the smaller pieces will dry in half the time of the larger, and as the tray must be exposed long enough to dry the largest, grading enables the dryer to use some of the trays twice as often as he otherwise would. The fruit should not only be graded for size, but the different varieties should be kept distinct, otherwise uniformity of fruit for market cannot be secured: for instance, some varieties of peaches shrink twice as much as others, and hence, if the same size when green, would be only half as large when dried. Varieties differ also in color. Fruit should be uniform in size and color, even smaller sizes of fruit will bring more money when uniform than will all the sizes if left ungraded.

— Picking. —

Fruit does not attain its full color and flavor until it has come to maturity. Pick the fruit when fully ripe, but not ripe enough to become soft. Care should be taken to bruise the fruit as little as possible, as bruised fruit is sure to turn black. Prunes should be fully ripe, so that they will shake from the branches at the least touch. They may then be gathered by hand, or shaken gently from the tree into a sheet placed underneath to receive them.

— Packing. —

Boxes of dried fruit, as a rule, require to be faced only. To do this, turn the box upside down, taking off the bottom, and over the lid, on which a sheet of paper has been previously laid (some put strips round the sides as well), carefully arrange pieces of pressed or flattened fruit in the bottom, which may be prepared by selecting pieces of the dried fruit uniform in size, and running between an ordinary clothes-wringer; well fill in with loose fruit, press down tightly, and nail on the bottom; reverse the box and put on the label, and it is ready for market. Large quantities of fruit are marketed in white cotton bags of various sizes.

— Shrinkage. —

Apricots, green, 5½ lb. make 1 lb. dry. Peaches, 6 lb. make 1 lb. dry. Prunes, French, 2½ lb. make 1 lb. dry. Prunes, silver, 3¼ lb. make 1 lb. dry. Prunes, German, 2¾ lb. make 1 lb. dry. Pears, 7¼ lb. make 1 lb. dry. Nectarines, 8 lb. make 1 lb. dry. Apples, 6 lb. make 1 lb dry. This table shows the average shrinkage of a mixed lot of fruit. The loss of weight is not so great with varieties specially selected for drying purposes.

— Varieties. —

In planting fruits for drying purposes it is, as a rule, best to select those of a firm flesh and rich, full flavor; the loss of weight in the dried products of juicy, soft fruit is much greater than when the flesh is solid. In peaches, use free stones for drying and clings for canning! although the latter dry well they give considerable trouble in pitting. For the purpose of making prunes, select those kinds of possessing extra drying qualities, firmness of flesh, and which do not ferment at the pit.

— Evaporators. —

These vary so much in size, form, and material that it is hardly possible to do more than explain the main principle upon which they are all constructed. It is absolutely necessary to have a constant and rapid current of hot, dry air to pass over the trays of fruit, carrying away with it the moisture given off by the fruit. This is generally secured by having the furnace at the bottom, and in close proximity to the furnace an opening which can be closed at will, to let in the cold air, which, heated by the furnace and equalised in the air-chamber above, then passes over and around the trays of fruit and away through an opening at the top charged with the moisture given off by the frpit.

Evaporators of various makes can be ordered from any hardware merchant, or a home-made evaporator could be easily constructed by observing the essential principals herein briefly explained.

In drying the fruit in the evaporator, commence with a heat 240 deg. Fahr. for about twenty minutes and gradually decrease. It will often be found necessary to change the trays occasionally, those at the top being placed at the bottom, and those from the bottom on the top; care should be taken not to overdry the fruit; when taken out the fruit should be slightly pliable.

.—Storing Fruit.

Late apples and pears require to be gathered carefully and placed in a scrupulously clean storeroom, cool and dry, each variety sorted by itself. The real object in storing is to arrest the ripening process. This is best attained by closely observing the essential conditions requisite. which are: a total exclusion from light, a uniform low temperature, which should be maintained, if possible, without variation. While provision should be made for ventilation, the air in the storeroom should be still, so that no current should pass over the fruit and dry the juices out. A free current of air passing over the fruit in a storeroom does one of two things: it either dries the juices of the fruit out, or, if the entering current is warmer than the surface of the fruit, deposits moisture upon the cooler surface of the fruit, and thus sets up decay.

Disordered digestion in adults is often the outcome of being compelled or allowed to eat rich food in childhood.

Physicians are advocating the use of pure olive oil for weak lungs. It bids fair to take the place of cod liver oil, and it is thought by many pleasanter to take.

The Effect of Grass on Trees.

In the Thirteenth Report of the Woburn Experimental Fruit Farm, 1911, the Duke of Bedford and Mr. Spencer U. Pickering again draw attention to the extent of the damage done to young fruit trees by grass, and an account is given of experimental work that has been carried out since then, to test further the effect of the grass and to try to obtain a satisfactory explanation of its action.

It has been found that the extent of the effect depends on the rate at which grass spreads over the area cleared when the tree is planted, but in all the experiments extending over sixteen years, and carried out at several centres, there was only one case in which the deleterious action of the grass was not marked. In the majority of cases it was considerable, and in many it caused the death of the tree. In none of the experiments has any recovery from the effect been noticed, except in cases where the roots have extended beyond the grassed area into cultivated ground. Ten years' records of the trials at Ridgmont show that the value of the fruit obtained from dwarf apple-trees grown in grass was only 7 per cent. of that obtained from trees grown in cultivated ground exactly similar in all other respects. It is, however, pointed out that the majority of the trials were so planned that the effect of the grass would be exercised to a maximum extent—the trees were young, and the grass did not spread gradually over the ground, but seed was sown (or turf replaced) immediately after the tree had been planted. Where the grassing over proceeds gradually, the trees apparently accommodate themselves to the altering conditions, and suffer much less than when the grass is actually sown over their roots. The fact that a tree has become well established in the ground before the land is grassed does not, however, prevent it suffering.

Standards on the free stock and dwarfs on the paradise were almost equally affected, though some varieties of apple were less affecred than others, owing, doubtless, to their vigour of growth. Pears, plums, and cherries were also affected, though in the case of these trees the standards suffered less than the dwarfs.

One of the most stiking facts is that the action became noticeable as soon as any of the roots of the tree had entered a grassed area, no matter how small was the proportion of such roots to the whole root system of the tree.

It is suggested that in some soils, where the effect produced is not great, grass might be advantageous from a commercial point of view, for the check given to growth tends to increase the cropping, and grass affects the colouring matter of all parts of the tree, generally resulting in a high colouring of the fruit.

Forest trees appeared to be affected by grass in the same way as fruit trees when grass was sown immediately after planting, though in the case of conofers on a light soil the effect was much less than with other trees, and some recovery gradually took place.

Explanation of the Effect.—The most commonly accepted explanation is that the tree roots suffer from the competition of the strong and widely searching grass roots, in obtaining moisture and plant food, particularly the former. The writers of the report are, however, unable to accept this solution, and give full accounts of experiments designed to test it.

Their findings and arguments may be summarised as follows :—

1. The effect of grass is pronounced in wet seasons as well as in dry ones.

2. Trees which are affected show none of the characteristic signs of suffering from drought; and, in fact, in a time of drought the grass shows the effect much sooner than the trees.

3. The difference between the foliage of trees grown on cultivated soils and that of those grown on grass is most marked in autumn and spring, when there is plenty of moisture in the soil.

4. Determinations of the water content of soils, in which trees were suffering from the effect of grass, did not show lack of moisture as compared with cultivated soils; in fact, rather the reverse.

5. Affected trees artificially watered still continued to show the effect of the grass, even when the grass roots were prevented from coming into contact with those of the tree.

6. Extra manuring to affected trees did not do away with the effect of grass, which also was just as marked when the crop was grazed by goats as when mown and left on the surface, as was ordinarily done.

The effect of aeration of the soil was also insufficient to account for the better thriving of the trees grown on cultivated soil, and in the same way there was no evidence to suggest an alteration in the physical condition of the soil or a change in the character of the soil bacteria sufficient to account for the effect.

Partly as a result of experiments designed to test the point directly, and partly as the result of eluminating all other possible explanations, the authors conclude that in the growth of the grass a substance toxic to the root of trees is formed. This substance however easily oxidises, and if the grass is killed, or removed, the trees soon recover from its effert.

— Deep Planting of Forest Trees on Sandy Soils. —

A recent German agricultural publication reports that the drought of 1911 caused heavy losses in forest plantations in Germany, and to guard against similar losses in future deeper planting, especially in light dry soils, is advocated. The resulting formation of tap roots will, it is claimed, ensure the success of plantations of pine on sandy soils,

oak on dry sandy loams, and beech on calcaceous as well as on sandy soils.

With regard to the depth, young plants, it is stated, might be planted so that they scarcely appear above the surface, while larger ones might be covered to about half-way up the stem.

Fruit Notes.

Those who intend planting new varieties should order at once. Don't delay till planting time. If large quantities are required, it is good policy to order several months ahead. It is a shock to wait till the last moment and find all the best varieties snapped up.

Summer pruning, which was not done during the months of January and February, may still be carried out during early March. The object of summer pruning is to induce fruitfulness. This work of pruning while the tree is growing should not be performed until after midsummer. If done early in summer a slight temporary check is given and rapid growth again takes place. Early summer pruning is only done to admit air and sunlight into the centre of the tree. This helps fruit to ripen quickly. By cutting back or cutting of laterals in midsummer we induce a fruitful habit. When a leader is crowded with laterals it is a good plan to remove some and shorten back others. If three of four shoots are disputing for supremacy as leaders, all but one (and that one in the best position) should be removed. Barren shoots should be cut back to induce a growth of fruit spurs. Any laterals or twigs which have cast their fruit buds (and this is often done) should be cut well back early in summer.

Drying Currants.

When the fruit is ripe do not pick bunches that are not black all over; half-green fruit dries a red colour and is worthless on the market. In good weather currants will dry in three days. Do not over-dry. After removing the fruit from bunches (and the small grower does this by hand) rub it through a winnower sieve, and finish picking by hand. After cleaning thus, put the currants in boxes to sweat. All fruit that is too dry will take up moisture from the others, thus an even sample is secured. A simple method of testing the dryness of fruit is as follows:—Take up a handful of currants, squeeze tightly in the hand. If all the fruit, while feeling moist, falls apart upon the hand being opened, it is just right; but if the handful remains bunched it must be dried further.—P. J. Curnow, Wirrabarra.

Vegetable Garden.

Notes for March.

Most of the summer vegetables are passing their best now, but later sown beds should continue to yield for some weeks yet.

In the tall growing varieties of tomatoes the plants develope long bare stems as the season progresses. If these stems are pegged down and well covered with earth, it will be found that they will root at the joints and the time of bearing considerably prolonged in consequence.

Melons, Cucumbers, Trombone, and Marrows still require plenty of water and liquid manure twice a week will be found to well repay the trouble entailed in giving it. Later sowings of French beans promise extra good yields. This crop depends largely on the attention bestowed on it. Water, manure, mulch and plenty of hoeing is the standard prescription for this vegetable.

Preparations for the spring crop of vegetables will have to be continued during this month. Seed sown and seedlings planted out. Where water can be supplied, if necessary, seedlings of all descriptions may be safely put out.

The thorough preparation of the ground on which crops are to be grown, is a subject upon which too much stress cannot be laid. If trenching is considered too much of an undertaking then the ground must be very deeply dug with the longest pronged fork which can be procured. Good deep digging is profitable in many ways for it saves manure and it ensures good crops. Cabbage, Cauliflower, Brussel Sprouts, and all of this family should now be making good headway. Where seeds were sown early, they will want attention in the matter of watering and in having the ground kept constantly moved.

Turnips, Carrots, Parsnips, Leek, red and white Beet, etc. may be sown freely, on well prepared beds. Soil of a loose texture is particularly important for all root vegetables if good results are expected. Peas and Beans should be largely sown this month and the hoe kept going between the rows when the seedlings are up.

Celery plants should be planted out into rows, and celery seed may also be sown for successive crops. Celery is a very popular winter vegetable and it would be much more grown, if it were thoroughly understood. A bed of celery should be in every garden, and it is certainly very easy to produce. It is valuable as a salad, a boiled vegetable, and for flavoring soups; it is also a reputed reliever of rheumatic pains and affections. It is best to sow the seeds in boxes or seed pans, covering them with glass to induce quick germination. The soil should be very fine and friable. When the young plants are from 1½ to 2 inches high, they should be planted out in boxes or in sheltered beds; and as they grow and become stronger, they should be planted out in their place in the garden. Rich, cool, and moist pulverized soil, well worked, and kept free from weeds, and careful attention, are all the requirements of the celery bed. The celery plants are generally planted out in trenches; and as they grow, earth is heaped up around the plant so as to thoroughly blanch the stems. An American method of blanching is to place a board on each side of the rows of celery plants, and secure them closely in position, so that as much light as possible is excluded. It is claimed for this method that it is a far cleaner way than the earth blanching; but the latter system produces a better quality of celery. There is a variety known as self-blanching, being naturally of a whitish growth. It is not to be compared to the varieties which are blanched by forcing, but it is very useful for soups and for flavoring.

How They Grow Cauliflower and Cabbage in N.S.W.

(Continued from last issue.)

The largest cabbage-producing district in this State is undoubtedly Burrawang, situated about 9 miles east from Moss Vale, and in the surrounding localities, including Wilde's Meadow, Myra Vale, etc., and extending to Robertson and Kangaloon. About 300 tons are consigned from Moss Vale station every month during the season, and large quantities are also sent out of this district from Bowral.

Large areas are also grown in the suburban gardens, as well as at Gosford and in the Maitland district.

This crop can be grown in practically every district in the State. Nearly any soil will grow cabbage successfully if sufficient manure and decaying vegetable matter are added to keep it in good physical and chemical condition.

As a rule, in the Burrawang district, the rich volcanic soils are chiefly used for the winter crop, and the lower land for the summer crop.

This vegetable has, perhaps, a wider range than any other, being more or less successfully grown in the hot interior, and on the cool tablelands. It is essentially a cool climate plant, and when grown in the hot districts must be planted so as to mature before the heat of summer.

— Raising Plants. —

In some portions of the State, and chiefly during the winter months, cabbage plants are raised from seed in hot-beds, and gradually hardened off before planting.

As with cauliflowers, the seed should be sown six weeks before the plants are required in warm weather; but during the cooler part of the year two months should be allowed.

— Distance of Planting. —

The distance varies according to the variety used. For the smaller varieties, such as St. John's Day, 2 feet 6 inches by 2 feet is sufficient, and for larger sorts, as Savoy and Succession, 3 feet by 2 feet. If the soil is of poor quality the plants should be given more room, and should be planted 3 feet by 3 feet. When planted at this distance on rich soils, the tendency is for the plants to become too large.

— Harvesting. —

The time to harvest is when the heart is fully developed, and does not yield to pressure from the hand.

Cabbages being planted closer than cauliflowers, the yield is, consequently, larger in number of heads, and a yield of from 500 to 600 dozen can be expected in average years. The average price is about 2/- per dozen.

— Varieties. —

Succession (Henderson's). — This is a very popular variety, and the one most largely grown. It is fairly early, has large flat heads, closely packed, carries well, and is a favourite on the market. It stands the heat of summer fairly well, and does not run to seed quickly. The best all-round variety grown.

St. John's Day.—This is one of the best for hot climates. It is very early, and produces a firm heart. A small cabbage.

Improved St. John's Day.—This is the best of summer cabbages, and altogether distinct from the small St. John's Day, being somewhat later and larger.

Savoy.—This is a very crinkled type of cabbage, having a very dark green colour and a distinct flavour. It is especially suitable for the cooler portions of the State, being planted in February so as to mature during autumn and winter, the flavour being considered best after exposure to frost.

London Market.—This is a good main crop variety for autumn planting.

Early Jersey Wakefield. — An early sort, and largely grown in small gardens. It has a very pointed heart, and should be cut as soon as ready for use, otherwise it will run to seed.

— Pickling Cabbage. —

The cultivation of this class of cabbage is identical with that for the other varieties. Most of these are red in colour.

FUNGUS DISEASES.

— Black Rot of Cabbage. —

(Pseudomonas campestris (Pammel), Edw. Smith).

This disease also attacks cauliflowers and other members of the cruciferous family.

Infection takes place through wounds, or through the pores on the edges of the leaves. The area affected becomes dry. If the stem of a leaf or a stalk of a diseased plant be cut across, a brown or black ring will be plainly seen, this being the best means of identifying the disease.

It is only in very moist seasons, and when the weather is warm, that the disease develops into an epidemic, and causes the destruction of the bulk of the crop. In ordinary seasons plants affected within a month after transplanting may live to produce heads, and good yields may be obtained from a field where almost every plant is affected. The rapidity of the progression and ultimate damage to the crop depend almost solely on weather conditions.

Where plants are diseased and ready for harvest, no time should be lost in harvesting them, as they do not keep.

Unfortunately there is no certain method of controlling the fungus, the only method being that of prevention.

It has now been proved that the fungus causing this disease lives on seed for a considerable period, and may easily be transferred by this medium to clean areas. It is therefore advisable to dip the seed in a 1-320 solution of formalin for 20 minutes just prior to sowing. This treatment does not interfere with the germination.

Manure that has come from animals that have eaten diseased plants should not be used in seed-beds, or upon the field where the crop is to be grown.

A rotation of crops should be practised, so that no crop of the same family is grown on the same land more than once in three years.

— Club Root. —

(Plasmodiophora brassicoe).

This disease is known under many names, the chief of which

re "Club-root," "Finger and oes" and "Club-foot."

The affected plants have a wilt-d appearance during the day, but ecover at night. The diseased lants seldom grow to maturity.

The disease is found to be orst on clay soils that are defi-ent in lime. The presence of orrel indicates a soil in which e disease is likely to develop apidly. It might also be men-oned that acid manures, such as perphosphate, encourage the dis-ase.

The cause is a slime fungus, d the disease is described fully the Agricultural Gazette (vol. , page 55-), from which the fol-wing has been extracted :—

When a section of an infected oot is examined under the micro-ope, it will be found that the rger cells are filled with a slimy bstance. These are infested with e slime mould, and, on account the presence of this parasite, the lls undergo remarkable enlarge-ent, and an influence is com-unicated to the outer neighbour-g cells, so that the roots be-me much swollen and distorted. is fungus obtains entrance to e cells of the growing root, and ere robs the infested tissue of vital fluids, and, gathering new rces in itself, fills the cells with own substances. This semi-id material then begins the pro-ss of spore formation, which re-lts in the production of millions minute bodies, each of which is pable of a new growth, when nditions are favourable. By the cay of the roots, which takes ace rapidly, and with much of-nsive odour, the spores are set ee in the soil. These spores there rminate by producing roving dies capable of penetrating, or ing absorbed by the thin walls the hair and other superficial lls of the root. The soil be-mes diseased in the sense that e germs formed in the swellings, d other distortions of the rots, e set free, and the earth holds em for an indefinite length of me.

Precautions and Treatment.—

From a consideration of the na-re of the Club-root fungus, and knowledge of the different kinds plants infested by it, there ay be some suggestions gathered to preventive measures. When is understood that the "Club-ot," and all the injury to the op accompanying it are due to internal subterranean parasite, it becomes evident that no treat-ment to which the infested plant may be subjected can give promise of a cure. Preventive measures must be relied upon, and, in the first place, all the refuse of a cab-bage, turnip, or other infested crop should be removed from the soil and burned. In view of t... that the soil may become more or or less impregnated with the germs during the growth of a crop susceptible to the disease, it is evident that a wise precaution consists in a judicious rotation of crops. Just what that rotation should be is a question for each grower to decide for himself, but, for the best results, cabbages or any allied crop should not be upon the soil oftener than once in three years.

It is possible to get relief by the use of lime, and, by its con-stant use, at the rate of 75 bushels (2 tons) or so per acre each year, cabbages have been grown at frequent intervals—al-most yearly, upon the same soil. It is likely that a soil naturally abounding in lime may be the best for cruciferous crops so far as "Club-root" is concerned.

INSECT PESTS.

— The Diamond-backed Cabbage Moth —

(Plutella cruciferarum, Zeller).

Walter W. Froggatt, F.L.S., Gov-ernment Entomologist.

Under the name of "cabbage grub" or "cabbage worm," the caterpillar of this little moth, once a European turnip pest, but now world-wide in its range, is well known to Australian cabbage growers, and also to the cabbage consumer when he finds the little green worms among the leaves of this useful vegetable. It has been known from a very early date among the English farmers, where it is more a turnip pest ; but it attacks both turnips and cab-bages when grown under the same conditions.

It was probably introduced into Australia from England, though it may have come via Mauritius, where it was a well known pest, and with which island there was a good deal of direct trade in early days. It was identified by Mr. Meyrick from descriptions furnish-ed in 1883 by the late Sir William Macleay, who stated that it was common in parts of Australia, and had been for some years previous-ly, particularly about Adelaide. It feeds upon all kinds of plants be-longing to the family Cruciferoe, such as the turnip, cabbage, cauli-flower, mustard, cress and char-lock and a number of similar weeds often found about neglected gardens.

E. & W. HACKETT

AGRICULTURAL SEEDS.


CHOU MOELLIER.

Dwarf Essex Rape for Green Feed.
Mustard Seed. Chou Moellier
Thousand-Headed Kale.
Cattle Cabbage. Vetches or Tares.
Rye. Seed Wheat. Seed Oats.
Seed Barley. Fodder Grassses.
Lucerne.

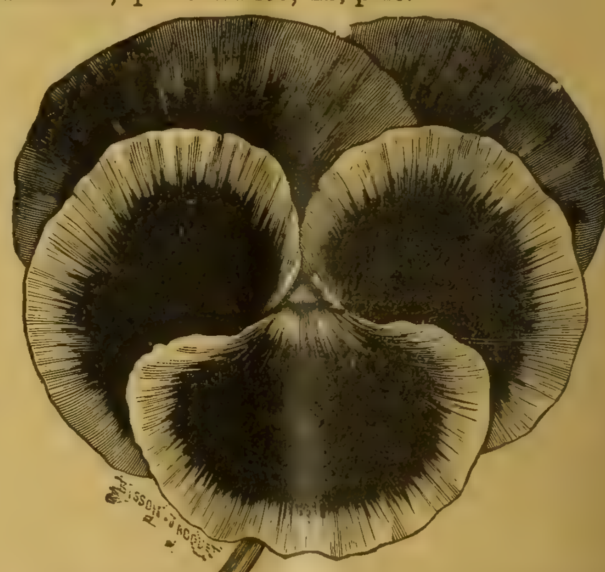
Novelties in Flower Seeds.

Petunia, dwarf, large-flowering, "fringed," 1s. 6d. packet.
Petunia, dwarf, large-flowering, "Superbissima," 1s. 6d. packet
Cyclamen Rokoko, double "Gloria," pkt. Lobelia, hybrida, "Sapphire," 1s. pkt.
Antirrhinium, large-flowering, "Venus," lovely pink, set off by a pure white throat, 9d pkt
Dianthus, Heddewigi, double yellow, 1s. pkt.
Primula Malacoides alba, 1s. pkt. Pentstemon, pure white, 1s, pkt.
Cineraria, in 2s 6d and 1s pkts
Calceolaria, in 2s 6d and 1s pkts
Cyclamen, several sorts, 2s 6d, 2s, 1s and 6d
Double Stocks. Sweet Peas. Mimulus.
Anemones and Ranunculus Seed. Petunias.
Phlox Drummondi. Polyanthus Primroses.
Anemone and Ranunculus Roots.
Nemesia. Linaria. Calceolaria.

PANSY Exhibition, 2s. per packet.

Scotch Show and Fancy, 2s. 6d. packet.

Also Pansy in 3d. and 6d packets.



WHOLESALE AND RETAIL

Seedsmen, 73 Rundle Street.

Raisin Drying.

The best grapes for raisins are Muscatels, but Raisin des Dames and Maddresfield Court, Black Muscats and Malagas make good raisins for home use. The grapes should on no account be cut until perfectly ripe. If possible, they should hang until the ripest on the bunches begin to dry. In the cooler districts it is better not to make raisins at all, for the grapes are usually too deficient in sugar to make a first-class raisin. The appearance may be alright, but the quality is not so good as those made in the hotter districts.

For table raisins or "layers" the finest bunches only should be taken, and all defective and small grapes should be cut off with pointed scissors, the bunch being held by the stalk, so that the bloom will not be rubbed off. The bunches should be laid carefully on the trays with the best side up. The trays should have cleats to keep the tray two inches off the ground. This will facilitate the drying. In hot weather the raisins may dry in about seven days, but it is advisable to take longer, say, 12 days. When they the about three-quarters dry, or say, in seven or eight days—these figures are only approximate, as all depends on locality and weather—they are carefully turned by placing an empty tray on top, and deftly turning both over, leaving the fruit on the tray, and the old one empty for turning the next. They must not be allowed to become too dry. When ready, they the packed tray above tray to await sorting. This should be done early in the morning, when the stems are slightly moist and flexible. Some berries will be found too dry, and some hardly dry enough, and to equalise them they are placed in boxes slightly larger than the tray, and about 18 inches deep. These are called sweat boxes. Stout, glazed Manilla or brown paper is placed at the bottom, and at intervals, as the layers of raisins are filled in, to prevent the tangling of the stems and the breaking of the bunches. As they are being put in the sweat boxes they are sorted into two or three grades, and each bunch is handled separately by the stem, so as not to rub ofl the bloom of the fruit.

To ascertain if a raisin is fully dry, take it between the thumb and finger, and roll it gently until softened, when either jelly or water will exude. If jelly, it is dry; if water, it requires further drying. The raisins remain in the sweat boxes, packed one above another, in a cool, dark room, from ten to twenty days. The fruit is then ready for packing in neat, clean wood boxes, holding 7 or 14 lb., with fancy paper.

Loose or pudding raisins are prepared much more rapidly. The grapes are picked in baskets or boxes, and brought to the drying ground, where they are placed on a wire tray and dipped for, from 10 to 20 seconds, into a shallow tank of boiling lye-water, made by adding about one pound of carbonate of potash to three gallons of water, or 1 lb. of Green bank's concentrated lye (caustic soda, 98 per cent. strength) iin 15 gallons of water kept at a temperature of about 180 deg. Fahr. After being dipped in lye, the object of which is to break the skin and facilitate drying, the fruit is plunged for an instant into clean water, to remove the soda or potash, and tahen spread on the trays and arranged on the drying ground. They dry more quickly, and do not require the same care. As soon as sufficiently dry, and while the stalks are brittle, the raisins are rubbed off and put through the winnower; or, if possible, the dry fruit is put through a special machine called a stemmer and grader. The loose raisins are placed in large boxes to equalise, and are then packed in clean deal boxes containing either 28 or 56 lb.

Trays.—These should be of wood. Those who have to procure a supply will do best to suit their own ideas, 6 x 3 and 4½ x 2½, have been found convenient by some. In California there is as much divergence of opinion as here, but, probably, there are as many 3 x2 feet as all the rest put together. They are most easily made of three pieces 6 x ⅜ in. pine or spruce, or four pieces 6 x ⅜ in., 3 ft. long, held together by a cleat across each end 2 ft. long, made of 2 x 1 in. deal or pine. The cleats are nailed close to the ends by the thinner edge, so that if the trays are packed one above another there is a distance of two inches between each pair. These trays can be handled by one man if necessary. They will hold about 20 lb. of frpit, which will produce in the dryer districts about 6 or 7 lb. of raisins. For home use any convenient substitute for trays may be used.

Extraction of Oils from Citrus Fruits.

Every year in all orchards from various causes a certain amount of fruit of different kinds is not readily marketable writes the "Queensland Agricultural Journal." This, of course is a dead loss to the fruit grower unless he has some means of utilising the product, either as pig food or, in the case of apples, cider-making. The skin of citrus fruits, such as oranges, lemons, limes, cumquats, shaddocks and "poor man's orange," contains a large amount of essential oil, which is a product always in demand for manufacturing purposes. It is by the extraction of this oil that a profit can be made out of waste citrus fruits, if it can only be done economically. From information that we have received, it would seem that the means of extracting the oil is now available in the shape of a simple machine which can be worked either by hand or by power invented by Messrs. Allport and Davenport, two practical West Indian planters, long resident in one of the most important citrus centres in the West Indies. The sole rights to the invention have been secured by Ecuelles Limited, Chancery Lane, London, W.C., from whom catalogues and price lists can be obtained. The machines are designed solely for the extraction of "hand-pressed" citrus oils (otto). They are not in any way connected or associated with any system for the production of distilled oils.

The essential features of the machines are:—A travelling pressing device, and a stationary puncturing device so arranged that the fruit is rolled along between these two devices, the cells in the outer skin of the fruit being punctured and pressed, so as to expel the oil they contain, and the oil so extracted is collected by another device for that purpose. The whole machine is so adjusted as to provide for variations in the size and shape of the fruits, in the texture of their skin, and in their different behaviour under the action of external pressure, and also to protect the oil when extracted against volatilisation, admixture with foreign substances, emulsion, or neutralisation.

All the parts of the machines which come in contact with the oil or the fruit are constructed either of brass, copper, or wood.

These machines only deal with the outer rind of the fruit, and do not affect the pulp in any way, so that limes and lemons from which the oil has been extracted are just as suitable for the manufacture of limejuice and citrate of lime, etc., and oranges for the manufacture of marmalade or wine.

Under the previous "Ecuelle-pan" method, the oil recovery industry was only profitable in "black labour" countries, and even there the cost amounted to at least 30 per cent. of the gross value of the product, whereas the mean cost of extracting the oil by means of the Ecucelling machine is stated to average from 1 to 8 per cent according to the variety and condition of the fruit. This implies that by it, orange-growers who have unmarketable produce, will find the extraction of the oil a remunerative business. Under fair conditions the yield from these machines should be: From limes, ½ oz. to 1 oz., according to the condition of the fruit; but under average circumstances, ¾ oz. per bushel of limes, and 3 oz. per bushel of oranges may be, it is said, confidently expected.

The machines are made in three sizes:—

The Small Machine, with simple gravity feeder for hand power only, making thirty to forty revolutions per minute. This is recommended for small lime-growers, but not for oranges or lemons, except in the case of very small orchards. This machine is capable of treating about 30 to 35 bushels of fruit per hour.

The Intermediate Machine A, with standard gravity feeder for hand or power, makes forty revolutions per minute. It is specially recommended by the proprietors for limes, lemons,

and oranges, and will treat from 50 to 60 bushels of fruit per hour Oranges and lemons should be put through the machine twice.

The Intermediate B, with standard force feeder, is for power only, and is only suitable for limes of which, making sixty to seventy revolutions per minute, it is capable of treating 90 to 100 bushels per hour.

The Largest Machines A, for oranges and lemons only, for hand or power, make forty revolutions per minute, and can treat about 180 bushels per hour. The Large B machine for limes, driven by power only, makes sixty to seventy revolutions per minute, and is capable of treating about 180 bushels of limes per hour.

Curculio Beetle.

"The Curculio Beetle" belongs to the great family (curculionida) or weevils, which comprises some of the worst pests with which the horticulturist has to contend, such as the apple root borer (Leptops hopei; the plum curculio (conotrachelus nenuphar), etc. With seed of various kinds, and trees and plants, both indigenous and exotic, the members of this fami,y have done incalculable damage, and are likely to continue their destructive work for some time to come owing to the many difficulties in the way of the suppression.

The adult insect usually measures about 1-16th of an inch in length. That is from the tip of the snout to the posterior end of the wing cases, and about an inch across the back or dorsal surface of the wing cases. The beetles are of a reddish-black or brownish-black colour, varying to almost solid black in some of the older insects They usually appear about November and continue their ravages through the summer months, disappearing again about March.

As far as the writer can ascertain, it appears that little information is available regarding the life history of this particular pest under our conditions. In all probability its life history is similar in many respects to that of some other members of the same family with which we are more familiar. That is, the eggs are laid close to the surface in sheltered parts of the soil, chiefly around the base of those trees or plants that provide the food of the mature insect. The larvae hatch out and live on adjacent roots, puating in early spring, after which the beetles soon make their appearance. In some cases the adult insects have been found hibernating in crevices around trees or other hiding places during winter.

Owing to the meagreness of the information regarding the habits of this insect there is not sufficient evidence to show whether the larvae live on the roots of the plants attacked by the beetle, or on decaying vegetable matter, or on the root of weeds and grasses. This lack of definite knowledge regarding the habits of this pest is a disadvantage in undertaking any means of combating its destructive work. It appears to be fairly certain though, from the habits of the adult insects, that a portion of its life has been a subterranean one. The nocturnal habits, the strong aversion to bright daylight, and the instinct in seeking a hiding place in the soil, seem to point that way.

The beetles crawl up the trees when drakness arrives and, reaching the terminals of the branches, usually cling from the underside or edge of the leaves and eat into them from the margin, giving them a jagged, irregular appearance somewhat similar to that due to the attack of the leaf cutting bee. In extreme cases all the green fleshy cellular tissue of the leaves is consumed and nothing but the stalk and ribs are left. The remnant of the leaves left in such cases on such trees as figs presents an appearance somewhat like those of melons that have been badly attacked by the lback banded pumpkin beetle.

— Treatment. —

This should be based on what we know of the habits of the insect and should be carried out in the most economical and effective way possible. It should be borne in mind that the bettles do their work at night, that they are chewing insects, that they cannot fly, and that they take shelter during the day under any cover adjacent to their host. The fact that they are nocturnal feeders presents some difficulties in the way of treatment. It seems like hitt ng in the dark trying to combat a pest that makes its attack at night. This disadvantage is, however, counterbalanced by the inability of the insects to make their escape in flight and by their natural inclination to find a refuge during the day somewhere close to the trees.

Since they are unable to fly they must find their way on foot to the trunk of the trees and climb up to get at their food supplies. The return journey is made before the next day. Hence the plucing of a bandage around the trunk of each tree is a means of diminishing the pest. Crinoline bands of plate tin in conjunction with bagging will be found useful in this respect. The tin bands are cut about 3 to 4 inches in width and sufficiently long to go around the trees and provide for a little lap. In putting on such bands the uppermost edge is fitted as close as possible to the bark all around the trunk, thus preventing any beetle from squeezing between it and the bark in going up. The lower edge is spread out at some distance from the main stem. If the bandages are put on correctly and are of the right class of material, the beetles will fail to negociate them during the night, and numbers will be found in the early morning underneath the bands. These should be collected and destroyed. Bandages of bagging may also be used lower down than the tin bands as a trap. Tanglefoot papers, strips of cloth or paper smeared with a strong adhesive will often serve well, although it should be remembered that all forms of adhesive bandages should be carefully tended and frequently renewed as they are somewhat troublesome to keep in a proper state of efficiency.

Frequent cultivation close to the trees will also kill out numbers of the pest, especially when in the larvae or pupa stages. Many of the adult insects will also be injured and dislodged in this way.

In conjunction with bandaging of the trunks and frequent cultivation, spraying with arsenical compounds should be carried out. This latter operation is probably the most effective and economical way of dealing with this class of pest, and I would recommend the use of arsenate of lead for the purpose. This may be obtained in prepared form, there being quite a number of good brands on the market. In every case, however, the spray should be applied at high pressure and through a fine nozzle; care being taken to strike every part of the foliage. It is also advantageous to use strong solutions

If the grower is making up his own materials they should be prepared in the following quantities :—

12 ozs. acetate of lead, 5 ozs. arsenate of soda, 50 gallons of water. Prepare in the following way :—Dissolve the 12 ozs. of acetate of lead in 2 quarts of water and the 5 ozs. of artenate of soda in 3 pints of water in separate vessels, wooden or earthenware, for preference. Then pour the separate solutions into 50 gallons of water.

This formula may be increased in strength up to double quantities, i.e., 24 by 10 by 50 and used without fear of scorching the foliage. In cases where the pest is very bad it is advisable to use a strong solution.

Cultivation and Manuring of Orchards.

By J. C. Brunnich, Chemist to Queensland Department of Agriculture and Stock.

The old idea that orchards can continue to bear heavy marketable crops for years without proper cultivation and manuring is fortunately losing ground; but it still exists, and it will therefore not be out of place to draw attention to the importance of thorough cultivation and judicious application of manures on the profitable management of orchards.

A fruit tree, just like any other plant, requires, beside moisture, sunlight, and heat, other substances, generally classed as plant foods, which are assimilated with the aid of its leaves and roots, and utilised during the growth of the tree and production of the fruit.

The principal plant foods are: carbon, oxygen, hydrogen, utilised in the form of carbonic gas and water; and nitrogen, sulphur, phosphorus, potassium, sodium, calcium (lime), magnesium, and iron. All these substances must be available to the tree, and even some others, like chlorine, silica, manganese, etc., although used only in extremely small quantities appear also indispensable, and frequently the want of one or the other may lead to a failure of the crop.

A proper care of fruit trees aims at the preservation of the fertility of the orchard, and at a regular supply of all the necessary plant foods, with a careful conservation of moisture.

The great demand made by fruit trees on the soil is hardly sufficiently understood, and few will credit the fact that the average crop of fruit from an acre of apple trees removes considerably more plant foods from the soil than a crop of wheat continuously grown for the same period. Various fruits, moreover, make different demands on the soil, a crop of cherries, for instance, robs the soil of twice the amount of mineral plant foods than does a crop of apples or pears, and for that reason alone, cherry trees require a much richer soil.

A proper consideration of these points "leads one to wonder not why old orchards are failing, but why they have not ceased to produce merchantable fruit long ago."

The choice of a site for an orchard, the class of fruit to grow in each locality, the preparation and cultivation of the land prior to planting, falls beyond the scope of this pamphlet, and requires special treatment. Of course, original preparation of any orchard will be of the greatest importance to any subsequent treatment, and, in many cases, want of care in the choosing of the soil, site, locality, followed by years of neglect and want of care, may make later cultivation and application of manures, made with a view to renovate the orchard, quite unprofitable.

The objects of these notes are simply to give the treatment of the soil of an orchard by cultivation and manuring, and the reasons for doing so, and as a text, I could do no better than quote the abridgement and summary of Prof. L. H. Bailey's excellent bulletins, published by the Cornell University Agricultural Experiment Station: "The Cultivation of Orchards" (Bull. 74) and "Care of Fruit Trees" (Bull. 102), as follows :—

"If orchards are to be made profitable, they must receive as good care as other crops."

Good drainage, natural or artificial, is essential to success. Trees are impatient of wet feet.

Well drained lands are drier in wet spells and moister in dry spells than other lands. They can be worked earlier in spring.

Good tillage increases the available food supply of the soil and also conserves its moisture.

Trees should be made to send their roots deep into the soil, in order to fortify themselves against drought. This is done by draining the soil and by ploughing the orchard rather deep.

This deep ploughing should begin the very year the trees are set and it should be continued every spring until the habit of the trees is established.

Moisture is retained in the upper soil by very frequent, but shallow, tillage, by means of which the surface of the land becomes a mulch for the soil beneath.

Tillage should be begun just as soon as the ground is dry enough in spring. This tillage should be repeated as often as once in ten days throughout the growing season.

Tillage should not exist for the purpose of killing weeds. Weeds have taught the most important lesson in agriculture, to be sure, but the schoolmaster should now be able to retire.

Late cultivation may be injurious by inducing a late growth. At all events it can be of small utility when the tree begins to mature and rains become frequent. This season of respite gives the grower the opportunity of raising a green manure, and of adding fertility to his land at trifling expense and with no harm to his trees.

Fall ploughing may be advisable for farm crops, but it should generally be discouraged in orchards.

Only cultivated crops should be allowed in orchards early in the season. Grain and hay should never be grown.

Even hoed or cultivated crops may rob the trees of moisture and fertility if they are allowed to stand above the tree roots.

Cultivators is the best crop to raise in an orchard.

Sod is sometimes allowable in apple and standard pear orchards, but never in other fruit plantations; but even it should be pastured closely with sheep or hogs. If the stock is fed at the same time, the land will fare better.

Watch a sod orchard. It will begin to fail before you know it.

Probably nine-tenths of the apple orchards of New York State are in sod, and many of them are meadows. Of course they are failing.

The remedy for these apple failures is to cut down many of the orchards. For the remainder, the treatment is cultivation, fertilizing, spraying—the trinity of orthodox apple-growing.

In general, level culture is best. The modern cultivators and harrows make such cultivation easy.

Trees, especially apples, are often trained too high, because of the difficulty of working close to them. Modern tools will bring the heads within reach.

Harnesses with no projecting hames nor metal turrets should be used in bearing orchards. Those requiring no whiffle trees are also useful.

Potash is the chief fertiliser to be applied to fruit trees, particularly after they come into bearing.

Potash may be had in wood ashes, muriate and sulphate of potash, etc. Of the sulphate from 500 to 700 lb. may be used to the acre in mature orchards.

Phosphoric acid is the second important fertiliser to be applied artificially to orchards. It may be got as plain high-grade superphosphate (dissolved South Caroline rock), in the bone fertilisers, and perhaps in Thomas slag. Of the plain superphosphates, from 300 to 500 lb. may be applied to the acre.

Nitrogen can be obtained cheapest by means of thorough tillage (to promote nitrification) and nitrogenous green manures. There is really no occasion for buying it for fruit plantations, if the lands are properly tilled and cropped.

Nitrogen promotes growth. It should therefore be used with some caution, for orchard trees should be grown for fruit rather than for timber.

Barn manures are generally more economically used when applied to farm crops than when applied to orchards; yet they can be used with good results, particularly when rejuvenating old orchards.

In general, the commercial complete fertilisers are less rational for orchards than a fertiliser made for the occasion out of materials evidently needed by the trees; but the complete fertilisers give much better results than the prevailing indifference and neglect.

Cultivation may be stopped late in the season, and a crop can then be sown upon the land. This crop may serve as a cover or protection to the soil and as a green manure.

A green manure improves the soil by adding fibre to it and by increasing its fertility. It catches the nitrates which, earlier in the season, are used by the tree roots. Vegetable fibre in the soil increases its power of holding both moistures and plant foods.

The gist of it all is that orchards should be cultivated and fed. Cultivation should begin early and be continued often.

CARE OF FRUIT TREES.

"A. Sod-treatment of an orchard is a survival of the time when orchards were mere incidental accessories to the farm, and when the destiny of the apple was the cider barrel.

B. No one cause can be assigned for all the failures of orchards to bear. The rause may be different for each orchard, and its determination, therefore, is a local question in each instance. The experimenter can discover the various agencies which may make orchards to be unproductive, but he may not be able to ascertain which one, or which combination of them may affect any given orchard.

C. The orchardist is to discover the causes of his failures, first, by acquiring a knowledge of the fundamental requirements of fruit trees, and, second, by carefully watching and studying and experimenting with his own plantation.

D. Some of the leading agencies or errors which lie at the bottom of the unproductiveness of orchards are as follows:—

(a) The plantation lacks plan and forethought.

(b) The land is often unsuited to the purpose, particularly in respect to its aspect, drainage, and general physical make-up.

(c) Neglect of tillage or cultivation is the most universal fault. This tillage should begin early in the season; it should be stopped in late summer or early fall; it should begin when the orchard is planted and should be applied to the entire surface; and it should be performed in such manner as to keep the land in fine and uniform tilth.

(d) Lack of plant food is probably a common cause for failure.

(e) Good trsatment may be begun too late, after the habit of the trees has become too thoroughly established to be readily broken.

(f) It is a common effort to raise annual crops in bearing orchards and to allow the trees only the skim milk.

(g) Pruning is often neglected.

(h) Insects and fungi may hold a mortgage on the crop.

(i) Poor or ill-sorted varieties render may orchards unprofitable.

(j) Trees may be expected to be unproductive if they are propagated from unproductive trees."

(To be Continued).

Rearing Calves on Skim Milk.

The introduction of the hand separator did much to solve the problem of calf rearing. It is true that the separator creamery has, to a large extend, brought separated milk into disrepute among those who wish to rear calves on the skim milk. After milk has been hauled a few miles to the factory, heated to separating temperature, and then hauled home and probably not fed till the evening, it is as unsatisfactory a food for calves as could well be imagined. But warm sweet skim milk separated within a few minutes after being drawn from the cow is in the best possible condition for the calf.

As a supplement to the skim milk the calf should be taught to eat a little grain. He can be started by the time he is four or five weeks old, by rubbing a little of the dry meal over the end of his nose and allowing him to lick it off. There is no better meal for this purpose than chopped oats from which the hulls have been removed with a sieve. Oil meal is sometimes recommended; but the oatmeal will give better results. The oil meal is more nitrogenous than new milk, which we must assume to be Nature's balanced ration for a growing calf. To add such a nitrogenous substance as oil meal to a ration that is already abnormally rich in protein, is only to intensify the evil. The ground flax seed or a little flax seed jelly will give good results, much better than the oil meal; but there is nothing to be very much preferred to the sifted oat meal above referred to. It has the advantage, too, of being within the reach of everyone.

Professor Curtits, of the Iowa Experiment Station, conducted an interesting experiment to test the relative values of oil meal, oatmeal, and cornmeal with flax seed as adjuncts to skim milk in calf feeding. Eight calves were fed in each lot. The following table shows the result of the experiment:—

Lot 1 (oil meal and milk).—Total feed given, 9150 lbs. separated milk, 1730 lbs. hay, 875 lbs. oatmeal, total gain, 873 lbs.; average daily per head 1.47 lbs.; cost of feed for lb. gain, 2.1 cents.

Lot 2 (oatmeal and milk).—Total feed given, 9150 lbs. separated milk, 1730 lbs. hay, 875 lbs. oatmeal total gain 927 lbs.; average daily per head, 1.57 lbs.; cost of feed per lb. gain, 2.1 cents.

Lot 3 (corn meal, flax seed and milk).—Total feed given, 9168 lbs. separated milk, 1731 lbs. hay, 772 lbs. corn meal, 84 lbs. flax seed; total gain, 925 lbs.; average daily per head, 1.56 lbs.; cost of feed per lb. gain, 2.2 cents.

It will be noted that the calves receiving oatmeal made not only the fastest, but also the cheapest gains of the lot; and this in a country of cheap corn.

Commenting on the experiments Professor Curtiss writes:—"The results of all the investigations made at this station strongly indicate that it is not only unnecessary but poor economy and poor practice to feed a highly nitrogenous product like oil meal in combination with separator skim milk. The practice has neither logical reason nor scientific theory for its support; and in the corn and oats, there is no necessity for the purchase of a high-priced nitrogenous product to be used in supplementing the skim milk ration."

Better results will be obtained by feeding the meal dry than by stirring it into the milk, as is often done. Before the starch in the grain can be digested it must first be converted into sugar by the action of the saliva. If the meal is gulphed down with the milk the saliva has not time to act upon it, and the starch, instead of being in the form of a soluble sugar in the stomach, nourishing the animals, is present in a partially soluble and semi-digested form, acting as an irritant on the delicate membranes lining the digestive organs, and resulting in purging and all the other train of evils that usually accompany indigestion. Do not give the calf more grain than he will lick clean in a short time. It is a bad plan to keep a supply of meal constantly before him; the meal sours and is fouled with the calf's breath until he wearies of the smell and taste.

Calves will do better if kept in a clean airy box stall during the summer than if allowed to run at large, fighting flies in the hot sun. They should be given a drink of water at noon and should have access to salt at will. They should also have some grass or green oats cut and given to them every day. They should not be given very much at a time; not more than they will eat up clean before the next time of feeding.

Every effort should be made to keep the calves steadily gaining. It should never be forgotten that, a given weight of gain can be produced on a calf at a little less than half the cost of the same gain on the same animal in his three year old form.

Explosives in Agriculture.

STUMPING LAND WITH DYNAMITE.

The American farmer has come to the conclusion that he cannot any longer afford to use the stump puller. The loss of time and labour from endless breakdowns, the cost of repairs, the time lost in setting, moving, and operating, the arge holes left in the ground, the mmense amount of soil to grub off the stump roots, and the unwieldy and large size of the stumps, making it so difficult to nove and burn them, all condemn the stump puller, except of course, under certain conditions.

Now, by the use of dynamite, all these objections are overcome. When properly used, dynamite takes the stumps out completely, and breaks them up into small pieces, that can be easily and rapidly piled up, or loaded, hauled and burnt.

As an example, we will take an nstance recorded by a Minnesota (U.S.A.) farmer. He had to clear 20 acres of heavy pine. The stumps averaged 50 to the acre, or 1,000 stumps in all, measuring from 18 to 4 ft. across, the average being 30 in. Every stump was blasted regardless of size. From one-half cartridge to eight cartridges were used, or an average of three cartridges per stump. Now, as to the cost. Dynamite cost him 13 dollars (£2 12/6) per 100lbs. (200 cartridges), or 6¼ cents (3¼d.) per cartridge, or an average of 19¼ cents (9¾d.) per stump for dynamite. Add ¾d. for blasting cap and fuse, and this makes 10½d. per stump. One man at 8/4 per day bores the holes, loads, and blasts on an average 50 stumps per day, at a cost of 2d. per stump for labour, making a total cost of 1/0½ per stump. With 50 stumps per acre, at 1/0½ each, the average cost per acre for blasting is 12.50 dollars (£2 10/5). It costs £1 10/7 per acre to haul and burn the stumps, making the total cost £4 per acre. Compare this with the cost of stumping heavy forest land in this State. What would it cost to stump by hand such enormous trees as are found on, say, the Blackall Range, particularly about Beerburrum. — Queensland Agricultural Journal.

— A Local Demonstration. —

.. demonstration of the usefulness of explosives for removing trees and stumps, ditching, and subsoiling was given at Mount Barker recently. The test was reported in the "Advestiser" as follows: — The first stump chosen was a pine of about 30 years' growth. Evidently the soil and climate are eminently suited for the growing of pines, for this stump, 2ft. above the ground, was 10ft. in circumference. A hole was bored in the ground towards the tap root with a 2-in. auger, and 30 plugs of gelignite were inserted and fired. This was repeated on the other side of the stump, and although the earth was removed from underneath, the tentacle-like roots still held the stump in place. These roots, which ran almost horizontally from the stump, were then operated on. With a 1-in. auger a hole was bored into each root, and one plug of gelignite was placed in each hole; then all were simultaneously fired. Upon examination every root was found to be completely severed, leaving the stump ready to be hauled. The next stump was about the same size, but the experience gained in the first saved money in the second. In this case the operations were reversed, the tentacles were cut by gelignite, then three holes under the stumps were charged and fired simultaneously. Spectacularly and financially the effect was grand. One portion of the stump weighing over 2 cwt. was blown at least 50ft. into the air and fell 120ft. from the place of explosion, the rest of the stump being removed many feet. The unbelievers were completely won over by the signal success of this experiment. The whole cost for gelignite, fuse, detonators, and time was as near as possible 7/. The general opinion among the onlookers was that the stumps would have taken one man one and a half days to grub. A blackwood tree 25ft. high and 50-in. in circumference was blown out of the ground after about ten minutes' work, at a total cost of 2/. The effect was then shown on growing redgum trees, ranging from 45ft. to 63ft. in height and from 4ft. 6in. to 7ft. 6in. in circumference. It was surprising how quickly, simply, and cheaply these trees were taken out. The preparations for the largest of these gums took only ten minutes, and at a cost of 3/- the job was done. The smaller trees took about the same time for preparation, but the cost in each case was lessened by 6d. to 9d. per tree.

For ditching, dam-sinking, and general excavation work explosives must in the near future be very greatly used. The holes for the ditching experiment were prepared by novices, but were not properly placed. The proper position is zig-zag fashion, the holes to be 2ft. apart in a straight line. A plug of gelignite was inserted in each hole and fired. The explosions caused the ground to fly, and as a result all along the line of fire it was broken up to a depth of 3 ft. or more, making the removal of the loosened earth a matter of simplicity. For subsoiling proper a new powder of Australian manufacture was used. This was fired by means of a primer in the shape of a third of a plug of gelignite with the detonator. The holes were bored 2ft. deep and 10ft. apart, and the charge inserted and fired. Little result was apparent on the surface (except in the case of one hole, where a double charge was placed for experiments) but below the ground was broken in all directions, the cracks extending from one hole to the other. At the actual spot of the explosion a spade could be driven down to the handle. For those who contemplate planting trees of any kind, roses or shrubs, preparation of this nature is advised for three reasons, viz., time saved, money saved, and the roots of trees or shrubs get no check in their growth.

The Horse Bot Fly.

The bot-fly, also known as the horse bee and gad fly, is described by Kirk as follows:—

The female fly is about the size of an ordinary bee, and might at first sight be mistaken for one. The body is covered with yellowish-brown hair, and has dark markings. The wings are nearly transparent, with a spot of dark-brown at the tip, and a cross bar of the same colour near the widest part. The abdomen is long and pointed, but is usually carried curved under.

The male has a short blunt body, the wings marked similarly to those of the female.

The eggs are deposited on the hair of the horse, usually on the inner side of the knee and foreleg, on the shoulder, the mane, and on the long hairs under the lower jaw. They are very firmly attached to the coat by a strong glutinous substance, and remain so till hatched by the warmth of the horse's body, aided by the moisture of his tongue as he licks himself.

The tiny maggots are taken into his mouth by the tongue, and are swallowed with the food, many of them, of course, being killed during mastication. They then, by means of hooks, attach themselves firmly to the lining of the stomach. In this position they remain till spring, by which time they are nearly full-grown, and about ¾ inch long. In the spring they loose their hold and are voided along with the excreta.

By means of the bristles attached to their sides, they immediately burrow under the manure into the earth, or under any other shelter, where the change to the chysalis stage is undergone. From the chrysalis the perfect flies emerge in about six weeks during the summer.

Symptoms.—Horses suffering from a severe attack of the parasitic larvæ usually show some of the following symptoms: they lose flesh, go off their feed, and sometimes bite their sides, cough, have difficulty in breathing, and stiffness of the joints, followed in some instances by convulsions.

Deaths have been reported, but such cases are extremely rare. In every instance where veterinary surgeons have held post mortems some undoubted cause of death, such as rupture, has always been found.

Remedies.—It is generaly believed that there are no safe and effective cures, but the following have been tried with more or less success, and are given on the authority of those whose names are attached:—

Mr. H. Thompson, M.R.C.V.S., says "I have never seen the stomach entirely perforated, but the irritation induced by the development of the larvæ causes in many cases a great wasting of flesh in the horse. I know of no medicine that will destroy them, or make them leave their winter quarters until fully developed. As a medicine, 2 ozs. turpentine and 20 ozs. raw linseed oil mixed, and given as a draught once a fortnight, is the best remedy, i.e., if it is thought the loss of flesh of the horse is due to the presence of bots."

Tonics are also administered.

If in doubt whether a horse is infested with the bot-fly larvæ, Dr. Frankish, of Christchurch, recommends: "A quarter of an ounce of aloes mixed with half an ounce of 'Shag' tobacco, moistened with treacle, made into a ball, and given to the animal." He says that if any of the larvæ are present some will become detached, and will be seen in the droppings; the larger dose he prescribes below should then be administered: "Three ounces of 'Shag' tobacco, moistened with a little glycerine or treacle, to which half a teaspoonful of oil of cajeput has been added, should be made into balls, and the whole given as a dose. Two hours afterwards half a pint of linseed oil in a pint of gruel should be administered. If notice be taken of the evacuations, the larvæ of the bot-fly will be easily seen. The above is for a hack. Half the quantity is the dose for a pony, double for a draught horse. This system of treatment has been found successful when tried early, and is therefore beyond the region of experiment."

Preventive Measures.—Even if a really reliable remedy were available, it is better to prevent an attack than to cure it. Therefore every precaution should be taken to protect horses from the fly, of which they appear to have a great dread, frequently becoming very excited when the insect is hovering about. Should this restlessness be observed, the animals ought to be examined to ascertain if the eggs have been deposited, and, if so, the wash herein suggested should be at once applied.

Several mechanical contrivances, such as knee-caps, aprons for fitting

closely under the horse's throat, &c., have been invented, and in some instances patented. It is very doubtful, however, if any purely mechanical appliance will prove efficacious. That, luckily, is not of great moment, for the following precautions will, if carefully carried out, prove effectual in preventing the deposition of eggs on the coats of horses:—

Working horses should, after being groomed, be rubbed over with carbolised oil, kerosene emulsion, or other substance obnoxious to flies. The best agent for this is carbolic sheep-dip, one part of dip in about twenty of water.

Where horses are kept in numbers, the wash may be applied by yarding the animals and using a spraying-machine with "Cyclone" nozzle, such as is found in every well-managed orchard. The mist-like spray will permeate the coats of the horses, and while its effects last no fly will attempt to deposit her eggs on them.

One application per week will in most cases prove sufficient.

In paddocks where affected horses are kept it is a very good plan, if larvæ are observed in the droppings, to collect and burn the excreta—the only sure way of killing the larvæ—thus preventing the emergence of numerous flies, and the laying of many hundreds of eggs.

Dragon-flies, and a species of Ascilus, occasionally attack bot-flies, but there is at present no known "natural enemy." The much-abused small birds also render some assistance by eating up the maggots found in droppings.

The first thing to do when a horse-owner suspects, or is pretty sure, that one of his horses is affected, is to isolate him; the next thing to do is to apply the remedy, as given later on; and the third thing is to burn all the stable-litter and thoroughly wash and disinfect the floors, partitions, and wood-work of the stable with a 10 per cent. solution of chloride of lime (say, a pound to 10 pints), keep a bucket or kerosene tin filled with a 5 per cent. (say, half a pint to 10 pints) solution of carbolic acid handy in the stable, and every day soak the brushes, currycombs, and other stable utensils used for the affected horses in it; in a large stable the same brushes, &c., should not be used for the clean horses as for the affected

The great stand-by for local treatment is composed of Stockholm tar and soft soap in equal parts, thoroughly mixed, and applied over the whole affected surface every evening for a week. In very bad or chronic cases of some standing a quarter of an ounce of arsenious acid (poison) very finely powdered should be thoroughly mixed with every pound and a half of the tar and soap, and applied in the same way. A few dressings of this mixture will generally effect a cure; but it is no use applying the dressing unless the stables are cleansed as directed, or the animal will be re-infected, and the whole process will have to be gone over again.

There are other remedies, such as decoction of tobacco, turpentine and oil, or petroleum and oil, but the one I have first given is the best.—R. Willmott, F.R.C.S., M.R.C.V.S. (London), Veterinary Surgeon.

Recipes for Poisoned Pollard.

No. 1.

Boil 3 quarts of water and 4½ lb. brown sugar in a clean oil-drum or kerosene tin. When boiling take off the fire and put in 1½ sticks phosphorus (3 oz.). After allowing a minute or so for the phosphorus to melt, boil the whole again. Then lift off the fire and immediately begin stirring in pollard so as to make a constantly-thickening soup. Stir hard, as this is the time to get the phosphorus well distributed. Continue adding pollard until the mass becomes very stiff. This is important. It will take about 9 lb. of pollard.

No. 2.

Mix in a pickle bottle, or tin with tight-fitting lid, 1 tablespoonful of bisulphide of carbon, 1½ sticks phosphorus, with ½ pint of cold water. Allow to stand till phosphorus is thoroughly dissolved. In 3½ pints of hot water dissolve 3 lb. of sugar. Pour both of above mixtures into a clean vessel and stir well, then add pollard until the dough is of proper consistency. This will require about 10 lb. of pollard. No. 2 recipe is considered the more effective.

— Rolling Out. —

Have a clean board and a roller, and keep them well dusted with dry pollard. Take about two handfuls of the dough out with a flat stick, throw dry pollard on it to stop any sparking, knead, and roll out to ¼ in. thick. Cut the cake so as to divide it into ½ in. squares, and throw the ragged edges back into the pot. Gather up the squares with the dry pollard, &c., and place in a box with more dry pollard. Lay by turning the sod with a spade, and putting two squares in each hole where rabbits are numerous, or a plough-furrow will do, the baits being laid at intervals in the furrow. Can be used with deadly result in driest weather if mixed as above, and is not affected by drought. The baits should be carried in a box or tin. Stock should, if possible, be removed from the paddock.

N.B.—Phosphorus should always be kept in water and for greater safety away from buildings. Bisulphide should be securely corked and stored in a cool place as the fumes are dangerous if inhaled.—Exchange.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Foul Brood or Bee Pest.

Foul brood or Bee pest is the most terrible scourge of apiculture. It spreads so rapidly by contagion in a single season, that, unless precautions are taken, a whole neighbourhood may become affected, and the chances of successful bee-keeping therein will be seriously imperiled, if not utterly destroyed.

Foul brood is caused by a rod-shaped micro-organism, called bacillus alvei, which increases by splitting, and has, under certain conditions, the power of forming spores. It is important to note that bacilli are present in the earliest stages of the disease, but in the latest, when brood has become rotten and coffee-colored, or has dried up to a scale, they turn to spores. These represent the seeds of the evil, and retain the power of germinating into bacilli when in contact with a suitable nourishing medium at a proper temperature, even after the lapse of long periods.

They are endowed with wonderful vitality. Freezing and boiling, carbolic acid, phenol, thymol, salicylic acid, naphthol beta, perchloride of mercury, a swell as creolin, lysol, eucalyptus and naphthaline, which evaporate at the ordinary temperature of the hive, prevent the growth of bacilli, but have no effect on the spores. From this it will be seen how great is the difficulty in curing foul brood, unless the disease is attacked in its earliest conditions.

When stocks are found weak, working languidly, very slightly profitable, and swarming little, foul brood may be suspected. If it is present, an examination of the combs will show some cells (many or few) with dying or dead larvæ in them; others with covers sunken, while the cells of healthy brood are usually compact, and the grubs are plump and of a pearly whiteness. When healthy, the young larvæ are curled up in crescent shape at the base of the cells. On the other hand, if diseased, they will be found extended horizontally in the cell, presenting a flabby appearance, and of a pale straw color. As they begin to decompose, the color changes to brown. Then they dry up till all that remains of them is a brown scale adhering to the side of the cell. Should the larvæ survive until capping takes place, a few of the cell-covers will be found here and there slightly indented and darker in color than those of healthy brood. The capped cells will be observed in irregular patches and mostly perforated. On removing the capping, the contents will be seen to consist of a putrid, sticky elastic, coffee-colored mass, formed of the rotting larvæ. The bees do not seem to have the power to clean out the foul cells, and so they remain, spreading infection within the hive, until the stock becomes too weak to defend its stores, when some neighboring colony probably robs it, and in doing so carries away the seeds of disease and death, which are thus spread, until all the hives of a neighborhood may be fatally affected.

Hives in which foul brood exists give forth a sickly and unpleasant smell, and when the disease is of a malignant type and in a very advanced stage, the foul odour may be frequently detected even at some distance from the entrance.

It should be noted that chilled brood must not be mistaken, as it very frequently is, for foul brood. In the former the dead larvæ turn first grey, and afterwards become nearly black, never brown, as with foul brood. The larvœ, dead from cold. are also generally removed by the bees, but they seldom attempt to carry out those which have died from disease, unless disinfectants to arrest decomposition are used. Adult as well as immature bees suffer from the pest, but these leave the hive to die.

Experience has plainly shown that with foul brood—as in all epidemic diseases—the weak, sickly, and badly-nourished are attacked, and become centres of infection to others. So it often happens that as colonies become weak, bees from healthy hives rob them of their honey, and thus carry off the germs of the disease along with their ill-gotten gains.

Another very important point is that the bee-keeper may himself be the means of spreading the pest by indiscriminately manipulating, first diseased, and then healthy hives, without taking proper precautions to disinfect himself and his appliances. Combs which have contained foul brood retain the spores. The queen lays eggs in the cells and the workers deposit their honey and pollen in them. Both honey and pollen in this way become vehicles for the transport of the disease to the larvæ in the process of feeding by the nurse bees. Under no consideration should infected hives or combs be knowingly exposed to the visits of bees. Carelessness in this respect may work immense mischief to neighboring stocks and apiaries.

In endeavoring to get rid of foul brood, efforts must be made to raise to a high standard the lowered vitality of the bees, which first enabled germs of the disease to get a footing. This will be effected by keeping only strong stocks, with young and prolific queens, and good wholesome food, combined with cleanliness and proper ventilation.

Foul brood is so extremely contagious that it is advisable at all times to adopt preventive measures against infection. Naphthaline in balls is generally used for this purpose; two of

these, split in half, being the proper dose. The pieces are placed on the floorboard of the hive in the corner farthest from the entrance. The temperature of the hive causes the naphthaline to evaporate, and it must be, therefore, renewed as required. All syrup used for feeding should also be medicated with naphthol beto. When the bee-keeper has been in contact with diseased stocks, clothes, appliances, and hands must be washed with carbolic soap, and other articles disinfected by spraying with a solution of one ounce carbolic acid in 12 ounces of water.

It was formerly thought that honey was the only source of infection, so that, if bees were starved until they had got rid of the honey carried by them from the diseased hive, a cure would be effected. It is now known that the starvation method, good as far as it goes, has always failed from the fact of its not being supplemented by disinfection of hives and appliances.

When the disease is discovered in a weak colony, the destruction of bees, combs, frames, and quilts, together with a thorough disinfection of the hive, is by far the best course to pursue. The spores are thus annihilated, and the source of infection removed.

If, on the contrary, the colony be still strong, the bees may be preserved by making an artificial swarm of them. They should then be placed in a straw skep and fed on syrup to which three grains of naphthol beta have been added to every pound of sugar used, the naphthol beta being dissolved in alcohol and added to the syrup while still warm.

The infected frames, combs, and quilts should then be burned, and the hive disinfected by being either steamed, or scrubbed with boiling water and soap, and then painted over with a solution of carbolic acid (one part of carbolic acid to two parts of water). When the smell of the disinfectant has disappeared, the hive will be ready for use. The bees must be confined to the skep for 48 hours, by which time all honey they may have taken with them will have been consumed, and such of the bees as are diseased will have died off. Those remaining should then be shaken from the skep into a clean frame-hive furnished with six frames, fitted with full sheets of comb-foundation, and must be fed with medicated syrup for a few days longer. The skep used as their temporary home should be burnt. In order to avoid chance of robbing, all such work as is here described should be done in the evening, when the bees have ceased flying for the day.

It may be added that in attempting remedial measures of the nature described, it would be desirable, wherever such help can be procured, to seek the advice of a competent expert.—Leaflet 32, British Board of Agriculture.

Lime and Its Uses.

The decomposition of vegetable matter in the soil with the change of the nitrogen into ammonia and nitrates (the form in which nitrogen is absorbed by the plant), the absorption of nitrogen from the air by the root-nodules of leguminous plants, such as peas, beans, lucerne are all brought about by microscopic organisms, which thrive most vigorously in the presence of lime. The lime-loving nature of lucerne is well known. Before the discovery of the Chili nitrate beds the supply of nitrates was drawn mainly from so-called "saltpetre gardens," where nitrogenous organic matter, as urine, blood, and animal refuse generally, was mixed with lime and potashes, and allowed to ferment, the tiny organisms seizing on the nitrogen and converting it into nitrate. This same process goes on in the soil, and everywhere more rapidly in the presence of lime. Here it may be mentioned that lime destroys certain pests, such as slugs and worms in the soil.

Heavy applications of lime, up to five tons every five or six years, was the practice in Europe, but this is giving place to the more frequent application of smaller quantities. Carbonate of lime (limestone, shell lime, marl) can be safely applied at any time of the year, but the best time to put down caustic lime is after the crop is gathered. The reason for this is to be found in the chemical behaviour of caustic lime. When this is exposed to moist air it "slakes" to a fine powder, which is strongly alkaline and destructive to young and tender parts of plants. On long exposure to air the slaked lime absorbs carbonic acid gas therefrom, changing to the carbonate or mild lime, a neutral compound which has no corrosive action on plant tissue. Only after time, has elapsed for this change to take place should the seed be sown. The burnt lime should be placed at intervals in the field, and covered with moist earth or, if the soil is dry, some water may be sprinkled on the pile. In a few days it will have slaked to a fine dry powder, which should then be spread over the soil, and ploughed or harrowed in.

Limestone or shell lime should preferably be burned and slaked in heaps on the land. For not only is the action on the soil constituents and the vermin in the soil enormously increased, but, as 44 per cent. of the carbonate is expelled in the burning process, the cost of transport is almost halved, and, as the lumps of burnt lime crumble to powder as above described, the cost of grinding is saved. It must, however, be borne in mind that caustic lime should not be used on sandy soils except much organic matter is available or heavy applications of farm yard manure are made. In other cases limestone or marl is preferable for sandy soils. In general lime is of little benefit to really poor soils, but finds its best application in soils rich in available or potential plant food.

One inch of rain over 1 acre equals 101 tons of water. Therefore, the weight of 1 point of rain to the acre is approximately 1 ton.

Economic Value of Birds.

(Continued from January Issue).

The encouragement of birds to nest on the farm, and the discouragement of nest-robbing are therefore more than matters of mere sentiment; they return an actual cash equivalent, and have a definite bearing on the success or failure of the crops.

For centuries in the Old Country it has been a matter of general observation that the common singing birds subsist largely on insects, and in modern times it has come to be generally understood that insects form one of the most important items of food for the great majority of birds; this has been confirmed by careful scientific investigation. Many species are now known to live almost wholly on insects, and in some large groups of species the average quantity of insects consumed forms a high percentage of the whole food. Dr. J. B. Cleland, of Sydney, in 1909, examined the stomachs of 57 birds, and published the result in the "Emu" of that year; and out of these, only five were found not to have insects in them; and in 1911-12 he has again examined another 250, with the result that he has demonstrated that the stomachs of the wrens, robins, thrushes, and of all the honey-eaters together with other small birds, contain for the most part insect remains.

In view of the above facts one is impressed with the conviction that the birds must exercise an important influence upon the relative abundance of insects. That birds are an efficient check upon insect multiplication seems impossible of denial, and it is doubtful if anywhere in the animal kingdom any other restraining influence so important can be found.

To illustrate the destructive capacity of birds, it may be mentioned that in America over 3,000 insects have been found in a bird's stomach at one time.

The point has been raised, however, that in the matter of insect consumption birds are indiscriminate, and eat insects without regard to species or to their economic significance.

It has been asserted that in devouring useful insects birds counteract all the good they do by eating harmful ones. It is quite true that they destroy many useful insects, and while at first sight this may appear to be an argument against the usefulness of birds, a broader philosophy will show that it is exactly what they should be desired to do.

It is possible that no species of insect is so completely protected by habits of life that it is not found and preyed upon at one or another stage of its existence by some species of birds. Even in those cases where so-called "protective" devices have been developed, investigation of the contents of the stomachs of many birds has shown that they are effective only to a limited extent, that in spite of protection—colouration or form, nauseous odours, and acrid secretions—insects so protected are found and eaten by birds, and in many cases form a considerable percentage of the average animal food. Many of these caterpillars are covered with hairs, and some species have also stinging spines, evidently intended for defence against enemies; but despite this, they are freely eaten by cuckoos, and are also found in the stomachs of other birds.

From these considerations it would appear that the main function of insectivorous birds is not so much to destroy this or that insect pest as it is to lessen the numbers of the insect tribe as a whole—to reduce to a lower level the great flood tide of insect life. That this is the true relation of birds and insects should be inferred from the fact that the two have lived together for countless ages, and that the balance of nature has been preserved except as disturbed by the operations of man.

— The Balance of Nature. —

Birds have not wholly destroyed predaceous and parasitic insects on the one hand, nor, on the other, have they so far as we know exterminated any vegetable-eating pest; but they have successfully held the balance between the two, and kept both at such a level of relative abundance as has subserved the best interest of the animal and vegetable world; and it is only where man has interfered with this balance that it has resulted in damage to him and to the products of his labour. Fortunately birds eat insects indiscriminately, so that the two great opposing forces — the vegetable eaters and the birds and insects that feed upon them—are kept in a state of practical equilibrium. This is the ideal natural condition.

Man, however, when he settles in a new country proceeds at once to overturn the natural equilibrium by cutting down the bush, ploughing up and draining the marshes, or irrigating dry places, thus producing marked disturbances in the animal and plant life. Some insects, deprived of their natural food, turn to the introduced

plants, and in many cases find them more abundant and more palatable than their former food, and so thrive and increase rapidly.

The birds are not able to multiply with such facility, and so are unable at first to deal with the greatly increased supply of food except to the extent that they increase by migration from surrounding territory. Moreover the seed and fruit eating birds have, like the insects, suffered a loss of their natural diet, and so turn to the farmer's crops for their supplies. He, in turn, seeing his crops preyed upon on all sides declares war on all animal life, and as birds, being in evidence more than insects, are more easily killed, he slays without consideration both those birds that feed upon his crops and those that prey upon the insect spoilers.

After years of misdirected effort man is at last learning the lesson that nature's adjustments are not to be lightly set aside; that when undisturbed by his influence each species maintains a certain maximum of abundance at which it does the most good and the least harm—from which it follows that his best efforts should be directed to restore and maintain this harmony, and in all places when he is obliged to destroy it he should seek for means to counterbalance the mischief.

In the case of insect depredations, while more immediate remedies may be necessary at first, there is little doubt that the protection and the encouragement of insectivorous birds offers in most cases the surest means of relief.

Now, just one word about our hawks and owls, from the standpoint of the farmer; and in this connection "a little knowledge is a dangerous thing." The farmer sees a hawk strike a fowl, the sportman finds the remains of a game bird, and without further investigation both condemn birds of this class, and lose no opportunity to destroy them and their eggs and young. How are we to account for this hatred against birds of prey by the very man who should be the first to clamour for their protection? Knowing that hawks and owls attack poultry they do not stop to think that such depredations may be committed by a few species only, but condemn the whole family. Both hawks and owls throw up pellets formed of the undigested parts of their food, such as hairs, feathers, bones, and other hard parts, which are rolled into a solid ball by the action of the muscles of the stomach, and are thrown up before fresh food is taken. When these pellets are examined you can tell everything which the bird has eaten, and I have a record of eight of these pellets examined by me picked up from under a tree in which one of the small owls roosted for some time; the record was grasshoppers, crickets, beetles, fur, and bones of rats and mice. How often are the services rendered to man misunderstood through ignorance? The birds of prey, the majority of which labour day and night to destroy the enemies of the husbandman, are persecuted unceasingly, while that most destructive mammal (the house cat) is petted and fed and securely sheltered, to spread destruction among the feathered tribe. The difference between the two can be summed up in a few words—only two or three birds of prey hunt birds when they can procure rats and mice for food, while the cat seldom touches them if she can procure chickens or young poultry, as most of us know to our cost.

That the beneficial species of hawks and owls will eventually be protected there is not the slightest doubt, for when the farmer is convinced that they are his friends he will demand their protection.

In conclusion, I would point out to you the fact that all insectivorous birds are the farmers' friends—not to be destroyed nor to be driven from the orchards and crops, but to be encouraged and welcomed as the allies which nature has provided to the farmer in his fight with his enemies. Every Australian boy who aims his pea rifle or catapult at one of these birds is as much an enemy of Australia as if he took arms to assist an invading force, which no Australian boy would do.

And now, with your permission, I will just touch for a moment on the sentimental side, and give a quotation. It is from "The Summer Hymnal," by J. T. Moore, and is as follows:—"Birds are nearer human than anything lower than man; they alone come nearer to ideal married life in rearing of their young, and the care and protection both parents give to their offspring, than anything else. They know more about the weather, the tides, the winds, and the stars than we do; more about nature than man ever conceived in his selfishness. The ruthless destruction of any one of them for whatever cause, whether for sport or to adorn the upper extremity of some less beautiful and lovely creature, throws the truth and the laws of the universe that much out of balance."

Potato Culture.

Mr. R. Camerini, manager for Dr. Fiaschi, recently read a paper on "Potato Culture," to members of the Sackville branch of the N.S.W. Agricultural Bureau.

Mr. Camerini said: In dealing with this subject I propose to lay before you some useful information gained from personal experience here and in other countries, especially in Algeria and Spain, where potato culture is one of the most important industries.

Varieties.—The number of varieties of potatoes is endless, and in selecting his seed the grower must be guided by his own experience in choosing the variety best adapted for his particular district, and the purpose the crop is intended for.

For early varieties (eight to twelve weeks), I would recommend Early Rose, Triumph, and Royal Ashleaf Kidney; the last mentioned is a variety largely grown in Algeria. Royal Kidney is a very early sort, but not a prolific yielder. Snowflake is a good yielder, but its cultivation cannot be advocated in this district as it is very susceptible to disease. For medium sorts (eleven to thirteen weeks) I found Ruby and Coronation among the best for local production. For late varieties, Peerless, Brownell's Beauty, and Robertson's Giant are recommended.

Degeneration of Potatoes is a fact known to many growers; this is especially noticeable with varieties which have been grown continuously in the same district for a number of years. The principal causes of degeneration or deterioration are soil or climatic conditions unfavourable to the normal development of the plant, negligence in cultivation methods on the part of the grower, and especially the sowing of unselected seed.

Preparation of Soil.—The potato may be regarded as cosmopolitan in so far that it grows in practically every climate in nearly every class of soil. In this district the alluvial flats, where well drained, are eminently suited for potatoes. The light, sandy soils produce the earliest sorts and also the best quality tubers, but the heavier class of soil usually produces the largest crop. As the development of the roots requires a deep, loose soil, the ground must be ploughed and worked accordingly. On account of the deep ploughing necessary and the frequent cultivation which land receives, the potato may be classed as a crop which improves the physical and mechanical condition of the soil, being thus also responsible for the destruction of weed pests.

The land cannot be ploughed too deeply for potatoes; this should be done at the beginning of winter, and be followed by rolling and harrowing. The subsequent cultivation prior to planting the seed should be of a shallow character.

Manuring.—In new ground in this district little or no manure is required, but on land croped for a number of years manuring is essential. Potatoes are heavy potash feeders, and also require generous proportions of nitrogen, phosphoric acid and lime.

For sandy soils rotted farmyard manure, ploughed in early in winter, will be found to be of great benefit if followed at time of planting with an application of artificial fertilisers containing potash and phosphoric acid. In heavy soils a few hundredweights of slacked lime applied some weeks before sowing will help to make the soil friable, and also assist in making certain essential plant-foods available

The following mixture is recommended for heavy soils for this district:—1½ cwt. sulphate of potash, 2 cwt. superphosphate, 1 cwt. dried blood, per acre.

In light soils, as previously stated, farmyard manure or green manuring will greatly improve the fertility and physical condition of the soil, but of course plant-food must still be added at time of sowing seed, and the following is the mixture recommended for light soils:—1½ cwt. sulphate of potash, 2 cwt. superphosphate, 2 cwt. dried blood, 1 cwt. gypsum of lime, per acre.

Selection of Seed.—Too much care cannot be taken in the selection of seed. In some countries, such as Italy, France, Spain, and Algeria, it is customary to select large, clean, well-shaped tubers, and at planting-time cut them in two (lengthways), or else medium-sized tubers are selected and planted whole. My experience is that small tubers, or small fragments of tubers, invariably give the lowest returns. Whole tubers of medium size are, in my opinion, the most suitable to plant.

Before planting, tubers should be carefully examined, and all those with very small eyes, abnormal characteristics, or signs of disease should be rigorously rejected. When cutting potatoes it is advisable to cut them lengthways.

Planting.—Planting may take place as soon as all dangers of frost are

over. Drills should be opened with the plough, 3 to 5 inches deep. The sets should be planted about 1 foot apart in the drills, varying a little according to the habit of growth of the variety planted. The seed, if cut, should be planted with the eyes upwards and cut side downwards: this will facilitate the growth of the young shoots. Another practice which I found to be good is to let the tubers become green and allow them to sprout before planting, by exposing them to the light. In this way the eyes develop more normally, and produce stronger shoots than when planted in the ordinary way. It requires some practice to plant out these tubers without knocking the young shoots off, and, of course, it takes considerably more time than planting cut seed, but a more accurate system of selection is assured, as only the strongest and healthiest tubers would be planted out; in such a way a supply of really good seed for future years can be counted on.

Intertillage.—The intertillage for potatoes is similar to that adopted for maize or tomatoes. The soil should be kept free from weeds, and the surface kept loose. The first cultivation should commence as soon as the rows become visible, and should be renewed whenever necessary. When the plants are about 10 to 12 inches high they may be hilled to a height of 2 to 3 inches. This operation is really of not much importance, but it keeps the tubers together and facilitates digging the crop. Nipping the flowers off usually increases the yield of the crop a little, but does not repay the expense.

Diseases.—The potato plant is subject to many diseases, the most common being early blight (Macrosporium solani), which is a fungus affecting the leaves and stalks, reducing the yield of the tubers considerably. Affetced plants show greyish-brown spots on leaves. The remedy is to spray with Bordeaux mixture.

Late blight (Phytophthora infestans) appears in black spots on the surface of the leaf with fine white hairs underneath. The leaves and stem rot and the tubers are affected. The remedy is spraying the growing crop with Bordeaux mixture.

Scab is another common disease with which most growers are unfortunately only too familiar. Preventive measures in selecting good healthy seed, and the dipping of the seed in a sulphate of copper or formalin solution for two hours previous to cutting, will be found to help materially in stamping this disease out.

Harvesting and Storing the Crop.—Potatoes intended for storing should be allowed to lie for a few days in a shed on a couple of inches of straw so as to allow them to dry; they may then be pitted, and should be covered with 2 feet of straw. Covering with earth induces conditions favourable to the development of various diseases.

Departmental Note.—Mr. A. J. Pinn states that in the experiments conducted by the Department it has been found that sulphate of ammonia is a better nitrogenous manure to use than dried blood. The mixture recommended by the Department is:—4 cwt. sulphate of ammonia, 13 cwt. superphosphate, 3 cwt. of potash; total, 1 ton. Of this mixture, 4 cwt. is applied per acre.

The use of formalin and sulphate of copper (bluestone) solution are mentioned for the prevention of scab. It is advocated (pending the results of experiments) to use formalin in a solution of 1 to 400, dipping for two hours, and if bluestone be used a 1 to 50 solution and dip for 15 minutes.

Maize in Ensilage.

As a guide to the proper time to cut maize for ensilage, the following table gives the quantity of water and dry matter in maize at different stages of growth, as determined by the New York (Geneva) Agricultural Experiment Station :—

Water and Dry Matter in Maize at Different Periods after Tasselling.

Stage of Growth	Grain per Acre	Water per Acre	Dry Matter per Acre.
Fully tasselled	9.0	8.2	0.8
Fully silked	12.9	11.3	1.5
Kernels watery to full milk	16.3	14.0	2.3
Ripe	14.2	10.2	4.0

This table in the last column shows the dry matter of maize at different stages of growth. Ripe maize yields five times as much dry matter per acre as maize that is fully tasselled, two and two-thirds as much as maize fully silked, and nearly one and three-fourths as much as maize in the milk; hence the importance of growing maize for ensilage that will mature. The table also shows the great waste in feeding maize green instead of letting it mature properly and making it into ensilage.

In order that ensilage may keep well, maize should be cut about the time the kernels are well glazed and dented. If it is cut too green, as stated, too much acid develops; if cut too ripe, it does not settle properly, and the air is not sufficiently excluded to prevent spoiling. The ripest maize should always be cut first and placed in the bottom of the silo, because the greatest pressure near the bottom will tend to exclude the air.

There is still some difference of opinion as to the value of sorghum for silage. The silage ferments more than maize silage, owing to the saccharine juice, and hence does not always keep well. There is no question as to its value when well preserved. Sorghum is a better yielder than maize on poor soils, and a surer crop in semi-arid regions. In the great maize belt (United States) its use is slowly increasing, while along the Gulf Coast, where the heavy rainfall makes it difficult to cure fodders, sorghum is a profitable silage crop, and can be successfully handled in this way. In feeding value sorghum silage appears to be slightly inferior to maize silage, the protein content being rather lower and the fibre content rather higher. However, the amount of water to the ton is also lower, so that the total amount of nutrient in each ton is larger than in maize silage.

The feeding value of both maize and sorghum silage can be increased by adding some leguminous crop. The two crops may be sown separately and mixed while being cut into the silo, or grown and harvested together. The cowpea is probably the best crop for this purpose. Sorghum silage has been largely used at this station as a winter ration and as a supplementary summer ration for dairy herds, with highly satisfactory results.

Maize and Potatoes.

At the experiment plots on Mr. J. Chick's farm, Tenterfield, N.S.W., Mr. A. H. E. McDonald, Inspector of Agriculture, delivered a lecture to members of the Leech's Gully Branch of the N.S.W. Agricultural Bureau.

The experiments under review, Mr. McDonald said, were established not merely to demonstrate that one variety is better than another, but to show how the best results can be obtained from a particular crop on the soil in use.

In raising a crop, consideration must be given to the following points:

1. Cultivation.
2. The selection of the right kind of fertiliser.
3. The use of the right quantity of fertiliser.
4. The selection of the variety.
5. The sowing of the crop.

Cultivation requires the most careful attention on the part of the farmer. It is of more importance than manuring, because it not only makes fertilisers more effective, but it also, in itself, renders the soil more fertile, because of its ameliorating effects. Besides its effect upon the fertilising materials existent in or applied to the soil, it is of supreme importance in regulating the supply of moisture to to the plant.

All soils, even the poorest, contain fairly large quantities of plant-food. A soil is poor because it is unable to supply to the plant the small quantities of soluble plant-food material required by that plant whilst growing. A good crop of maize, for instance, will only require about 40 or 50 lb. of soluble phosphoric acid during its growth. The yield is poor when this amount is not forthcoming. The material is made soluble by different agencies, in each of which moisture is an essential part. Time is also an important factor, so that if the land is only moist for a short time only small quantities will be made soluble. So if the land is fallowed, and the moisture conserved for a period before the crop is sown, a store of soluble plant-food is prepared for the crop

Further, in nearly every district the rainfall is rarely sufficient to provide for the maximum needs of the crop whilst it is growing, after allowance is made for evaporation. A soil may be able to suply to a crop 30 lb. of phosphoric acid, when with a full supply of moisture it would need 40 lb. Through the deficiency of moisture, however, 30 lb. are al that is required, of moisture. Fertilising under such and a low yield results through lack circumstances would only be partly effective. By fallowing, a full supply of moisture is provided, and fertilising improves the yield considerably, whereas without it the yield would be small, through lack of fertilising elements.

All land should be prepared for a crop by ploughing a few months before the sowing time. The ploughing should be deep and thorough. After ploughing once, the land should be kept loose, and free from weeds by cultivating and harrowing.

After sowing, crops such as maize and potatoes should be thoroughly cultivated whilst growing. The first working should be done with the harrow. Generally speaking, the harrowing should be given a short time after the crop has appeared above the ground. In some cases where rain falls immediately after sowing, the harrow can be used to advantage.

Fertilisers do not, as is supposed by some farmers, exhaust the land. As mentioned before, land contains large quantities of the fertilising ingredients. Crops take away a very small amount each year. The land is poor because it does not supply, in an available form, this small quantity. Each year about the same quantity becomes available, and fertiliesers supply the crop what is not supplied by the soil. Without the fertiliser the crop would be poor; with the fertiliser it is improved. If fertilisers are used one year the crop will be better than that of the previous year, but if next year the fertilisers are not used the crop will be as good as it was before fertilisers were used.

The best fertiliser for maize on most classes of poor soil is one containing 3 parts dried blood, 2 parts bone-dust, 4 parts superphosphate, 1 part sulphate of potash. This might be applied at the rate of 1 cwt. or 1½ cwt. per acre.

The fertiliser should be applied with a drill at the same time as the seed. The most suitable fortiliser for potatoes is a mixture of sulphate of ammonia, 4 parts; superphosphate, 13 parts; and sulphate of potash, 3 parts. This should be applied at the rate of 4 cwt. per acre.

The Construction of Pig Sties.

The following article is from a recent issue of the Journal of the British Board of Agriculture. It of course applies to conditions somewhat different to ours, but much that is written is equally applicable to pig keeping in Australia.

Contrary to popular opinion, no farm animal is really so clean in its habits as the pig, and probably none suffer so much if obliged to exist in wet, dirty, cold surroundings. In the case of all stock, any reasonable expenditure incurred in making them thoroughly comfortable is likely to be well repaid by the better return given for the food consumed, to say nothing of the prevention of those diseases which may arise from bad hygienic conditions.

The pig is an accommodating animal in many respects, but it is not fitted like other farm stock to withstand great changes of temperature; it is very sensitive to damp, and it may be said that pig-keeping is not likely to be a success unless warm, dry, fairly roomy, well ventilated sties are available. It is equally essential that the buildings should be so constructed that they can be easily kept clean, and disinfected from time to time. If these requirements are not satisfied, the most expensive and elaborate building will most certainly give poor results, while on the other hand, so long as these essentials are obtained, there is no reason why good results should not be obtained in the cheapest possible erection.

The common conception of a pig-sty is the small low lean-to building opening into an open court. This type of erection has the important advantage of being cheap, but it has serious disadvantages. The only opening into the sty proper is usually so low as to necessitate creeping into it, a fact which militates against frequent cleaning, particularly in wet weather, while it is difficult to inspect the pigs except about feeding time; it is too small and in other ways unsuitable for sows with litters; the building as commonly constructed is dark, badly ventilated, and owing to the absence of a door is either too cold in winter or too close and hot in summer. Futhermore, if it is not required as a pigsty, it is of little use for anything else, whereas a small building, say 10 feet by 8 feet, about 5 feet high at the eaves, suitably lighted and ventilated, and provided with a door in two sections, would not only be much superior as a pigsty, but would be useful for other purposes, e.g., poultry, storage of fuel, etc., if not required for pigs.

On farms it is doubtful if in ordinary cases, the erection of the common kind of sty is necessary or justifiable. As a general rule, all pigs except sows with litters, boars, and those nearly fat can be most economically and advantageously kept in the covered yards with fattening cattle. It is necessary to say that for the comfort of the cattle the number of pigs should not be too large, and for the sake of the pigs themselves they should have a dry corner fenced off for feeding and sleeping. If the manure from the stables is thrown into the yard, it is important to see that it is well distributed, or the pigs will choose it to sleep in, and "cramp" or "rheumatism" will almost certainly follow.) For young litters, buildings of the loose-box type, opening and draining into the covered yards, or pens cut off from the yards by walls about 5 feee high, are most suitable, and can be used for a great variety of purposes when not employed as pigsties. There is no trouble with drainage or in the disposal of manure, provided the floors are well above the level of the manure in the yards

Where pigs are kept in large numbers, accommodation such as that suggested is not sufficient, and special piggeries have to be provided. As already mentioned, the essential conditions required by pigs are warmth, dryness, sufficient room, and good sanitation, and so long as these are secured the arrangement and construction of the piggeries can, if desired, be regulated entirely by economy of erection and upkeep, and of labour involved in feeding and tending the pigs.

There are, however, certain essential conditions which should be secured in whatever kind of building is erected.

Situation and Aspect.—If at all possible a fairly high and dry position should be selected, and in no case should the level of the floor be below the level of the surrounding ground, since buildings so constructed are almost certain to be damp and cold.

Sties for boars, especially sties used for boars to which sows from other premises are sent for service, should be isolated from the sties in which other pigs are kept.

Floor.—This is in many respects the most important part of the building, and the part in which it is most difficult to combine conditions which are desirable from all points of view. For instance, for cleanliness, durability and cheapness there is no doubt whatever that a floor of concrete with a skin of smooth cement is the best. Such floors are, however, unsuitable for, at any rate, the sleeping quarters of pigs; they are always cold, and young pigs reared in houses with cement floors generally do badly, even if they do not develop cramp or rheumatism. Furthermore, if even slightly dirty they are as a rule very slippery. A compromise often made, is to have a cement floor, but to provide a movable wooden platform for the pigs to lie on, and this is good if the sty is roomy enough to allow of the platform being lifted frequently for cleaning purposes. Otherwise, dirt and manure will accumulate underneath. Probably a better plan is to have at least part of the floor laid with asphalt, or to make it of bricks set on edge in cement on a bed of concrete. Such floors are warmer than cement, give a much better foothold, and are fairly easily kept clean, though a slightly greater slope is required for efficient drainage.

Walls.—The walls must be weather proof, substantial and easily kept clean, and may be made of brick, concrete, or stone. Wooden walls can only be regarded as a makeshift, since with them it is impossible to avoid cracks or joints in which manure lodges, while the junction with the floor is always a source of trouble and unless protected by sheet iron or some such material, the lower part of the wall is gradually gnawed away by the occupants of the sty. If the wall is made of brick or stone, all joints should be smoothly pointed with cement to a height of at least 3 feet from the floor. When the sty is intended for breeding-sows, a rail, which is best made of iron tubing about an inch and a half in diameter, should be fixed about 10 inches from the floor, and the same distance from the walls, to protect the young pigs from being crushed. Partition walls need not be more than about 4 feet high, though in the case of a long building some should be taken up to the roof. In the case of extensive piggeries it is convenient to have some of the partitions so constructed that if required two or more sties can be thrown into one.

Roof.—The roof should be weather-proof and non-conducting, and may suitably be tiled, or boarded and covered with galvanised sheeting or thoroughly tarred felt.

In the case of lean-to sties, the roof should be not less than 4 feet 6 inches above the floor in its lowest part, and about 7 feet at the back. This is necessary in order to allow the sty to be thoroughly cleaned, and also to enable the animals to be examined and tended in case of sickness. It also ensures sufficient airspace and facilitates proper ventilation.

Airspace and Ventilation.—The airspace should not be so large that the buildings are cold, nor yet so small that, in order to secure efficient ventilation, draughts are unavoidable. Ventilation should be secured by openings in the wall and roof. Lighting, which is most easily done by panes of glass in the roof, should be sufficient. In order to avoid scorching of the pigs, the glass should be roughened and thick. Sunlight is a good and cheap disinfectant, apart from its direct effect on the health of animals.

Drainage.—Drainage is a most important point. It may be laid down as a general rule that there should on no account be a closed drain in any sty, and furthermore the drainage from each sty should be conducted separately to a main drain

(Continued on page 468).

Diseases of Horses.

PURPURA HAEMORRHAGICA.

(By Chas. S. Syrett, M.R.C.V.S., Veterinary Surgeon, Beverley.)

Purpura Haemorrhagica, also called petechial fever—typhus fever of the horse. This disease and scarlatina are practically identical. Purpura is an eruptive non-contagious fever, usually occurring as a result of some previous debilitating disease as influenza, strangles, pneumonia. It is a disease of a septic character, something akin to anthrax, but, unlike anthrax, it cannot be communicated by innoculation. The blood in this disease becomes very much altered, being very dark in color and very fluid, and is not coagulable. One of the first symptoms usually noticed is a swelling of one of the hind legs, usually in the hock, which, however, disappears on the horse being exercised. This swelling is characteristic of the disease, appearing to end abruptly above, as if a cord had been tied around the leg so as to stop the circulation, this swelling being the result of the blood and serum extravasated from the small blood vessels or capilliaries. The mucous membrane of the nose presents a marbled appearance and sometimes ulcerates and sloughs, causing a discharge of blood and mucous to issue therefrom. The membranes of the eye, etc., have a purple appearance, and have small dark spots upon them about the size of a pin's head, but which become larger as the disease progresses. The pulse is quickened, and the temperature very much elevated. The eyelids and lower lip are swollen, and sometimes a swelling appears between the fore legs; the nostrils also become swollen, so that breathing becomes difficult. The swellings may suddenly disappear from one part and appear again in another. The bowels are usually constipated, and the faeces are covered with mucous. The urine is scanty and highly colored and sometimes bloody. There is usually no inclination for food—when there is it is always a good sign. If the horse has a white heel or fetlock it is seen to be studded with purple spots. Purpura is occasionally a primary disease, being caused by badly drained, illventilated stables, etc., but may be caused by a chill when recovering from some debilitating disease. It is always a serious complication, seventy per cent of the cases proving fatal, but when recovery does take place the convalescence is always tedious, usually taking weeks.

Treatment.—The animal should be placed in a good, roomy, loosebox, where he can obtain plenty of fresh air. Half an ounce of chlorate of potash should be given in the drinking water, night and morning, and two ounces of turpentine in half a pint of linseed oil given every two or three days. Tinct. Ferri. Chlor. may also be tried, and sometimes a stimulant as whisky and water. Ammonia is contra-indicated. The swellings may be fomented with vinegar. Sometimes it may be necessary to perform tracheotomy.—Beverley "Times."

Poultry Notes

The Influence of the Cock on Egg Production.

The question is an interesting one, the interest being perhaps increased by the vagueness and supposition which it necessarily involves. This character of uncertainty is, unfortuately, present in most discussions concerning the original germ cell, i.e., in the case of the hen, the ovum in the ovary. Yet the advance made in this branch of science in recent years has been eminently encouraging, and has done much to lessen what was previously almost an abysmal ignorance on the subject. Albeit, the question in point—how far, if at all, the egg-production of the female birds is stimulated by the presence or propinquity of the male?—is still fraught with considerable uncertainty. In theory, however, I think one must agree with the conclusion that the presence of a male bird does have an inciting effect upon the egg producing power of the female. And this view, I think, is borne out if we consider some analogous facts which enjoy at the present day greater elucidation.

Now, what is exactly the problem that confronts us? It is this: Is it conceivable or scientifically feasible, that, from the point of view of the utility poultry-keeper who requires eggs, better results may be obtained through permitting the male bird to run with the females?

Let us turn the tables for a moment and ask what effect the presence of the hen has upon the male bird. It is not only possible, but extremely probable, that propinquity of a mature female to a mature male encourages the fission—and therefore the multiplication—of those cells in the male which are to form the spermatozoa or germ cells; and that, besides increasing the number of these mobile cells, it also tends to quicken their vital activity. I confess that I see no reason why the converse should not be true; in other words, why the presence of the male should not encourage or "force' 'the growth of the ovarian ova in the female. Each ovum of the ovary, whether large or small, is merely one single cell—just as in each single spermatodoon—and I venture to say that it is actually more probable that sexual desires aroused by the proximity of the male should have a directly stimulative effect on the ova in the ovary; in other words, on those cells which are to unite with the mals cells (spermatozoa) to form that cell out of which the offspring is to grow. Moreover, I think it is more likely that that which encourages the activity and multiplication of the male germ cells would also produce activity in the female germ cells. And for this reason: that one ripe specimen of the germ cells of each sex is necessary in order that fertilisation and propagation may ensue, and it is therefore obviously to the advantage of the species that the same (practically speaking) cause should have, in this respect, the same effect. I venture to say that if one admits that the presence of the male bird in a pen has any effect upon the desires of a hen—in other words, if we admit that the hen realises that a male bird is in the pen—then it is more probable that that knowledge should directly induce the rapid ripening of the ovarian ova.

There are instances of this accelerating influence of the male's presence in mammals, e.g., rabbits and goats; and I think it would need something more than the distinctive difference in the morphology of the ovum and the incubation of the embryo in birds as compared with mammals to exclude the aves from the effect of such influence. It is, I submit, a mistake to imagine that the growth of eggs in birds cannot be retarded or accelerated by external forces operating on the mind of the female bird. There is small ground for such an assumption.

I do not, however, think conclusions based on observations of very closely confined birds should bear too much weight. The mode of life of such a hen is so extremely unnatural and lazy, and such birds are so often overfat, that it would be treacherous to draw any definite conclusions from the behaviour of such a bird; though I admit that in theory the paucity of eggs is partly explicable by the absence of all external influence which might act on the mind or senses of the female as an incentive to procreate. Nor do I think we should be justified in laying any serious value on the single opinions of individuals who lived some considerable time ago. I say this not because such persons were in any way mentally inferior or less keen of observation—far from it—but simply because in this branch of science especially so much complete ignorance prevailed.

But is it necessary that we should continue to remain in ignorance concerning this question? I think not. The elucidation of the problem is excellently suited to be the result of such experimental research as any poultry keeper with a healthy interest in the subject and a generous desire to obtain useful information for his fellow poultry keepers might accomplish. Still better would it be if there were, say, half-a-dozen utility farmers in various parts of the country who would be willing each year to keep two pens of identical hens and mate only one of these pens. If, in such cases, careful records of the egg supply were kept, we should, I imagine, soon be in a position to speak more definitely and clearly on the subject.

In any case, let us hope that some stalwart fanciers will come forward who will be ready to begin a small experimental research with a view to proving practicaly that which is theoretically quite feasible, that the presence of the male bird has a decidedly stimulative effect upon the growth of the ova in the ovary, and therefore tends to increase the egg yield of the liens.—By P.I. in English Poultry.

[The above discusses an interesting point. South Australia has spent many thousands of pounds on experimental, or so-called experimental, work, but this question is one of several on which our expert apparently knows nothing. Is it not about time that our Poultry Department stopped admiring itself and got busy about giving other people a chance of doing so.]

(Continued from page 465).

outside. The plan of draining a row of sties by one channel which passes through each in turn should never be adopted; the lower ones are apt to be wet and unhealthy, and if disease—e.g., husk—breaks out in any sty, all the pigs below it are likely to become infected by means of the drain.

Troughs. — The simplest and best trough is made of glazed fireclay, semi-circular in section, and set in concrete. It should be set in the centre of a partition which, immediately above the trough, should consist of a hanging door supported by an iron rail. When hanging freely, this door is immediately over the centre of the trough, but it may be pushed inwards, thus completely shutting off the trough from the sty, or it may be pulled outwards, leaving the trough open to the pigs. The advantages of the system are obvious: the pigs can be fed, or the trough cleaned out, without the attendant entering the sty, while there is no chute where food is apt to lodge.

Courts and Runs.—Whether separate courts for the sties are provided or not, an extensive outdoor run is essential for sows and young pigs, and if possible a dry, sunny paddock should be provided for the purpose.

Lucerne.

Regarding the needs of lucerne, we could almost sum the matter up in four words—lime, drainage, humus, and inoculation. Perhaps we have given them in the order of their relative importance. Lime is necessary on soils not naturally of limestone formation or filled with limestone pebbles. The importance of this is impressed on us more and more each year; in fact, we believe to-day that there have been more failures throughout the country on account of insufficient lime in the soil than from any other cause. Then as to drainage: there is no use in planting lucerne on any soil where water may ordinarily be found at a depth of less than 3 ft. The lucerne may grow all right until its roots strike this water, but then it will die. Fertile soils contain enough humus; impoverished soils may be so deficient that special preparation must be made before lucerne can possibly succeed. Where stable manure is not available, on impoverished soils we would recommend preparation for lucerne one or two years in advance, growing such crops as crimson clover, mammoth clover, cow peas, Canada field peas, or soia beans, and preferably turning them under, or else pasturing greatest benefit possible from them. We recommend inoculation, not that them off, so as to give the soil the it is always necessary, but it is an inexpensive process, and in five cases out of six it will actually pay.—Irrigation Age, Chicago.

Bee-Keeping.

From Victorian Journal of Agriculture

Beekeeping in Australia is carried on under different conditions from those existing in other countries. In the Northern Hemisphere, and also in New Zealand, the principal supply of nectar comes from flora on meadows, roadsides, fields and gardens. In Australia we depend almost exclusively on our eucalypts and a few other native trees and shrubs. Owing to our hot summers, which prevent the secretion of nectar in soft, herbaceous plants, except on irrigated land and in exceptionally cool districts, the amount of honey obtained from other than native flora is small in comparison with the quantity harvested from eucalypts.

Even where climatic conditions are favorable to the secretion of nectar, the system of closely feeding down pastures, which is largely practised in Australia, does not permit of the proper development of the nectar-producing bloom. As probably over 90 per cent. of the honey produced in Australia is obtained from eucalyptus, this fact should be borne in mind when selecting a district in which to commence beekeeping.

For the purpose of becoming conversant with the habits of bees, to get some practice in handling them, and to gain the knowledge and experience not obtainable from literature bee-keeping may be commenced almost anywhere.

When, however, it is taken up as a business, a suitable district is essential to success. In selecting a site, due consideration should be given to the two main factors—the amount and variety of bee flora within a radius of two or three miles out of the site chosen. The permanency of the bee flora is, however, the most important consideration, and the intending beekeeper should locate on, or close to, some permanent forest or other reserve, so as to avoid the risk of having his honey resources destroyed by the ringbarking of the trees.

An even, gently sloping surface, of gravelly or sandy soil, will be found most suitable. It should, if possible, be sheltered by a natural or artifical wind-break on the south and west.

The honey-house should be placed at the lower end, and the hives arranged in such a way that a good general view can be obtained from the door and windows of the building, so that during the swarming season the apiary may be under observation while necessary indoor work is being done. Having the building at the lower end of the ground has the double advantage of getting a better view of the whole apiary, and of moving the supers of heavy honeycombs down hill at extracting time.

It is not advisable to stand hives under evergreen trees, such as pines or eucalypts. Colonies in permanently shaded positions never thrive so well as others out in the open. If placed under deciduous trees, as for instance, in an orchard, the hives will have shade during the hottest part of the day in summer, and sunshine during the cold months of the year, when the trees are not in leaf.

In laying out the apiary, it is better to place the hives in groups of twos, threes, or fours, with a longer distance between the groups, than to stand the hives singly in rows.

Perches for Poultry.

From American Poultry Journal.

We know but little of what constitutes the best kind of a perch. Poultrymen who have made experiments along this line have arrived at different conclusions. Some experiments made in Australia seemed to show that the birds preferred half-round perches. Others have said that the natural perch is the round perch, to correspond with the limbs of trees, to which the birds in their wild state were accustomed. One man who made experiments with different kinds of perchse said that his birds preferred 2 by 4's laid on their sides. This seems rather remarkable. The writer has used 2 by 4 in. set up on edge, and the birds seemed to be satisfied. It is true, however, that the fowls in this case had no choice in the matter.

Low perches are far preferable to high perches, and all perches should be on the same level. If they are arranged in ladder form, one behind the other, the birds will all seek the highest one, this being an instinct that has clung to them from the time when they had to seek the highest limbs of trees to keep out of the reach of foxes, shunks, and other wild animals. But, as man now protects the birds, this habit need not be encouraged. The high perches result in injuries to fowls, especially those of heavy weight. Also, when perches are high, eggs dropped in the night are broken, and the birds get a chance to begin a career of egg-eating. When the perches are low, eggs laid at night are seldom broken, especially if there is a covering of anything over the floor. Two feet from the floor is as good as any other height for perches.

All perches should be removable, so that they may be taken out at any time and cleaned. The writer has found the best way to be to have horses, say seven feet long, as end supports of the roosts. Notches are made in the tops of these horses, and the ends of the perches dropped in. They will be held tighly, and four or five roosts a dozen feet long may be used on these horses. These perches will always remain in place unless removed. It is only a minutes work to take out the roosts and remove the horses. If it is desired to prevent mites getting from the hens to the nest, the parts of the horses resting on the floor can be placed in vessels in which is kerosene. In that way the migrations of the red mites will be stopped.

Perches are always the point from which the red mites attack the fowls, and they should, therefore, he carefully watched. Red mites do not stay on the fowls at night, and generally collect on the under sides of the roosts. If the roosts are made of rough lumber, the insects will fill every minut e crevise. It is better, therefore, to have planed lumber, and to paint it. When lice get into rough lumber it is exceedingly difficult to rid it of the pests. The writer had a case of this kind, where he had to kerosene and burn over the roosts for four or five days in succession before they were fit to put back again. Where the insects came from each day was a mystery, but a new colony appeared each morning for a number of days.

"Do you mean to say that you flirted with your wife all the evening at the masked ball and didn't know her?" "That's right. But she was so deuced agreeable—how was I to know her?"

Breeding Poultry for Egg Production.

We have received some correspondence with reference to a paragraph we wrote last month in which we mentioned the failure of selection as ordinarily understood, and practised as a means of building up a strain of birds in which egg production shall be a continously progressive characteristic and we instanced the laying competitions as evidence and mentioned what is known as the Main experiment as supporting the conclusions to be drawn from the Roseworthy and other tests. Several of our correspondants have asked—after expressing a more or lest pointed difference of opinion—what is the Main Experiment. In reply we cannot perhaps do better than publish the most recent report in which the work of the past decade is summerised and reviewed by Dr. Raymond Pearl in the last issue of the Main (U.S.A.) Experiment Station Record. It is perhaps worth mentioning that that weirdly ridiculous person who writes under the name of "Breeder" in one of our Saturday papers recently indulged in a gentle sneer at Dr. Pearl and his work. Now when a person of "Breeders" standing or lack of it, pays such kindly attention to a man of Dr. Pearl's it is time somebody laughed, and no doubt many readers obliged in this respect, especially those who know the individual who hides behind the nom-de-plume. The better they know him the more they laughed probably. Talk about a flea trying to bite an elephant, why as an unaderlerated absurdity it is not a circumstance to it. Dr. Pearl can however defend the position he has taken up immeasurably better than we can, as readers will find when reading the following immensely interesting article, the earlier portion of which we reprint as follows :—

Since 1898 an investigation in breeding Barred Plymouth Rock fowls for increased egg production has been in progress at the Maine Station. This work was put under the direction of the present writer in 1907. No systematic or detailed report of the results obtained was made until 1909. Since that time a number of papers have been published dealing with one phase or another of these experiments.

Most of these papers cited above deal with certain essentially negative results obtained in the earlier years of the experiments. It seems desirable, as an introduction to the positive results now reported, to review briefly the entire history of the work at the Maine Station in the experimental breeding of poultry with reference to the character fecundity or egg production.

The earlier work of the Station on this subject, which covered the years 1898 to 1907 inclusive, was conceived, and executed in conformity, with the then prevailing views respecting the effectiveness of mass selection. The underlying idea which dominated these earlier experiments was that by breeding consistently year after year from the highest layers, regardless of all other considerations, there must be brought about a definite and steady, if gradual, improvement or increase in the average annual egg production per bird.

Two distinct and separate experiments were carried out during the period of the investigation prior to 1908. These may be designated as follows :

I Experiment in continued selection of fluctuating variations in fecundity.

II. Experiment regarding the inheritance of fecundity.

I. Experiment in continued selection of fluctuating variations in fecundity. In 1898 there was begun at the Maine Agricultural Experiment Station an experiment to determine whether egg production in the domestic fowl could be increased by the continued selection of the highest egg producers as breeders. This experiment was planned and started by Director C. D. Woods and the late Professor G.M. Gowell. An exact record was made of the egg production of each hen during the first year of her life ; trap nests being used to furnish the individual records. The plan of the experiment begun in 1898 was to make from a strain of Barred Plymouth Rock hens, which had been "pure" bred, i.e., without introduction of strange "blood," for a long time by Professor Gowell, a continuous close selection with reference to egg production. The practice in breeding was to use as mothers of the stock bred in any year only hens which laid between November 1 of the year in which they were hatched and November 1 of the following year, 150 or more eggs. After the first year, all male birds used in the breeding were the sons of mothers whose production in their first laying year was 200 eggs or more.

Close inbreeding was not designedly practiced. It was always in theory possible to avoid this, since after the first four years of the experiment the flocks were large (always containing more than 300 birds and usually nearer a thousand). While there was no close inbreeding no "new blood" was introduced into the strain from the outside during the period of the experiment.

II. Experiment regarding the inheritance of fecundity. In 1907 the experiment described above, having led to definite results was brought to an end. There was planned for 1908 a new experiment designed to test from another standpoint the conclusion which had been tentatively reached from the earlier experiment. In the conducting of the long selection experiment the females used as breeders were grouped into two classes, viz., (a) "unregistered" or birds laying 150 to 199 eggs in the pullet year, and (b) "registered" or birds laying 200 or more eggs in the pullet year.

It had been noted that the daughters of the so-called "registered" hens (namely hens that had produced 200 or more eggs each in the pullet year) did not usually make high egg records. The "200-egg" birds which made up the "registered" flock came, in most instances, from the "unregistered" mothers.

Experiment II was planned primarily to answer the following question : Will the daughters of high laying hens ("200-egg" birds) on the average produce more eggs in a given time unit than will birds of less closely selected ancestry ?

— Details. —

The experiment was carried out according to the following plan : On the first of November 1907, there were put into house No. 2, of the Station plant, 250 pullets. Each of these was the daughter of a hen that had laid approximately 200 eggs in her pullet year. As a matter of fact 11 of the 33 hens which produced these 250 "registered" pullets had each laid a few eggs less than 200 in a year forward from Nov. 1 of their pullet year. The writer has been criticized for including these birds in the work. When carefully considered such criticism appears to be without any real significance. In the first place nearly all of these 11 birds were "200-egg" hens in the sense that they laid this number of eggs (or more) in a period of 365 days following the laying of their first egg. The records were for the sake of uniformity in presentation and analy-

tical discussion taken as from November 1 of the pullet year to November 1 of the next year. That the records are taken in this way in no wise interferes with the fact that these birds were heavy layers. The further fact which entirely suffices to justify the inclusion of these 11 birds with the 22 which laid 200 or more eggs in the year from November 1, flows from the comparison of the daughters of the 22 in respect to average egg production. So far, from the low average winter production of all "registered" pullets in this experiment taken together being due to the inclusion of these 11 mothers, whose November 1 to November 1 record fell a little below 200 eggs, and their daughters, actually this group of progeny had a higher winter production than the remainder of the "registered" flock.

These pullets were divided into flocks of 50 each and were fed and handled in every way exactly alike. At the same time that these 250 "registered" pullets (so-called because from "registered" mothers), were put into the house there were also put in 600 other Barred Plymouth Rock pullets. These other pullets were of approximately the same age as the 250 "registered" pullets and differed in their breeding only in respect to their mothers. They came from hens that had laid less than 200 eggs during the pullet year and more than 160. "Registered" cockerels (from the "200-egg" line) were used as the male parents for all the pullets both "registered" and "unregistered." The 600 "unregistered" birds were divided into flocks as follows: Two flocks of 50 birds each were kept in two pens in house No. 2 exactly like the pens in which the "registered." birds were kept. The remaining 500 birds were divided into four flocks—two of 150 birds each and housed in the four pens of house No. 3. These pens are essentially like those of house No. 2, differing chiefly in the matter of size. A trap nest record was kept of the exact individual egg production of each of these birds.

— Results of Earlier Work. —

The essential results of the two lines of investigation described above may be very briefly set forth here. These results are:—

1. That mass selection for high egg production on the basis of the trap nest record of the individual alone did not, as a matter of fact, result in a steady, continuous improvement in average flock production, though it was continued for a period of ten years.

2. That, as a matter of fact, the daughters of "200-egg" hens with from 6 to 9 years of mass-selected ancestry (on the basis of trap nest records) behind them were no better layers on the average than birds bred from the general flock.

Now whatever opinion anyone may hold as to the biological interpretation of these results he must not after all forget that they are facts. While it has been argued that 10 years is far too short a time to learn anything about the effect of selection it should be remembered that he who makes this argument is really discussing a very complex theoretical matter. An unbiassed examination of the literature on the subject indicates that the length of time which is considered necessary to prove experimentally the effectiveness or non-effectiveness of mass-selection depends almost entirely upon which way the results are coming. If after following a plan of mass selection for even 3 or 4 years one finds that concurrently there has been an improvement in the characteristic selected for, he almost invariably and quite humanly concludes that the selection is the cause of the improvement. Just why, however, post hoc should be considered to be propter hoc when it happens to be "your" hoc but not at all so when it is "my" hoc that is concerned has never been clear to the writer. It certalnly seems fair to suppose that it requires just exactly as many years critically to prove by experiment that mass selection in a particular case is effective as it does to prove in another case that it is not effective. The situation here is precisely as broad as it is long.

— The Practical Man's Standpoint. —

Practically, from the standpoinr of the poultry man, whose interest in poultry keeping is confined to some part of the span of an ordinary lifetime, these results at the Maine Station give little encouragement to the idea of wholesale trapnesting with the expectation of thereby increasing the egg production of the flock. That the trap nest has a place in poultry husbandry is certain. It is equally certain, however, that trapnesting for the purpose of improving egg production by the selection of the best layers has not that degree of practical usefulness and importance which it was popularly supposed to have some ten years ago when the work of the Maine Station in breeding for egg production was being so extensively exploited by the agricultural press and by institute workers all over the country. It seems now to be quite generally agreed that about the only profitable function of the nest in practical or commercial (as distinguished from experimental) poultry keeping is in connection with special needs or problems, as for example, in the work of the fancier, who desires to keep individual pedigrees of his stock. There does not exist any critical evidence that the selection of the highest laying birds on the basis of the trap nest record as breeders will insure or guarantee any definite, permanent improvement in average flock production.

Since as a matter of fact, as the work at this Station shows, this method of seleceing breeders has very little, if any, real relation to the average production of subsequent flocks, it is obvious that, as a mere matter of chance, temporary improvement in production might be expected to follow this plan of breeding in about 50 per cent of all flocks on which it was tried, and a temporary decline in production in the other 50 per cent. This appears to be the actual state of the case. Some practical poultrymen who have tried trapnest selection of the best layers as breeders have obtained improved average egg yield for a time at least. They attribute the improvement to the selection, though without any critical evidence, of course, and are enthusiastic believers in the gospel

of the trap nest. Other equally competent poultrymen have failed to get any such improvement and have discarded the trap nests, though sometimes, it must be confessed, clinging firmly to the theory of breeding which their own experience has shown to be at least practically inadequate to meet their needs.

Not only was there no improvement in average flock production following the method set forth in the preceding section, but actually there was a slight decline in production during the selection period. No particular importance, however, is, in the writer's opinion, to be attached to this decline. It probably is to be regarded as due to chance, i.e., to a number of accidental causes operating together.

— Protests and Criticism. —

The results of this earlier work aroused a good deal of protest and criticism on the part of ardent believers in the efficacy of mass selection under all circumstances. Furthermore many persons have offered tentative explanations as to why these experiments in selecting for improved egg production resulted as they did. Some of these suggested critisms and explanations have been published, but most of them have not, but instead have been confined to verbal discussions among workers interested in the problems of breeding.

No attempt has been made by the writer to answer criticisms of this work. The discussion which follows has no polemic object. When, as in the present case, the point at issue is the critical interpretation of admitted results which are (and must be in nearly all cases) in some degree incomplete no amount of argumentation as to what "might" or "ought" to obtain, really helps very much in getting at the true facts. The most useful course would seem to be first to examine critically all possible interpretations and then devise if possible ways of testing experimentally which, if any, of these interpretations are really valid. With the presentation of the evidence so obtained the scientific case must rest, it seems to me, until additional and directly pertinent evidence can be brought forward. While the search for data bearing critically on the interpretation of breeding experiments on fecundity at this Station is by no means completed, yet it seems desirable now that certain of the positive results of the later experiments are to be presented to consider critically the possible interpretations of the earlier work, and to bring forward some of the evidence which has led the writer to the opinion which he holds.

CRITICAL CONSIDERATION OF POSSIBLE INTERPRETATIONS OF EARLIER WORK.

The critical interpretation of the mass selection experiment described in the preceding section is by no means a simple matter. As to the bare facts as such there can be no question, but how shall they be interpreted? What really do they mean?

There are two principal general interpretations or explanations which may conceivably be given for the selection experiments at the Maine Station between 1898 and 1907 turning out in the way which they did. On the one hand it may be said that the results indicate that the general theory of the effectiveness of selection, or even more broadly the theory of breeding, which was at the foundation of this experiment, is, in greater or less degree, inadequate or incorrect. That is to say, the experiment may be interpreted, as it has been by the writer, as showing that it is doubtful whether the picking out by selection of minute favorable variations has in reality any cumulative or additive effect, so far as concerns the hereditary or germinal at least with reference to the character fecundity or egg production in fowls.

Before reaching such a conclusion, however, one must consider on the other hand, alternative interpretations and see whether the facts cannot be equally well or better explained in some other way. A number of such alternative explanations may be thought of. Nearly all of these explanations which suggest themselves fall into one category. This category is, to characterize it in a word, the effect of environment. In general terms this explanation of the results obtained would run something like this: that in reality the selection for increased egg production practiced during the years 1898-1907 was inherently or essentially effective, but that during this same period of years one or another or a combination of environmental circumstances became progressively worse, so that the gain which may be supposed to have been made each year as a result of the selection was masked or hidden by the untoward effect af the environment which prevented the hens from laying up to what was their true or innate capacity in the way of fecundity.

— Important Factors. —

Specifically the possibilities here are large. There are many sorts of things by which a hen's laying may be disturbed and reduced. The action of such environmental circumstances furthermore cannot be prevented nor their disturbing influence upon a selection experiment eliminated by "keeping the environment constant" during the course of the experiment. This, of course, is the usual experimental method of attempting to safeguard against environmental factors disturbing the interpretation of the results of an experiment

having to do with inheritance. But, as a matter of fact, leaving aside as of no real importance in the present discussion the fact that with such animals as poultry certainly it is physically impossible to obtain anything more than average uniformity of environment during a long period of years there is a further point not to be lost sight of. This is that the effect of any adverse environmental circumstances acting upon an animal during the course of a long continued experiment in selection must tend to become progressively cumulative as time goes on, if it is really efficiently adverse at all.

What is meant is this: Suppose at the outstart of the experiment something in the method of feeding, or in the method of incubation or of rearing the chicks was of a character such as to affect adversely, even to a slight degree, the vitality or constitution of the birds. Even without any true inheritance of this effect nevertheless its action must necessarily tend to become cumulative for purely physiological reasons, because (to confine the discussion to the case in hand, namely the domestic fowl) it admits of no question that a constitutionally weak or debilitated fowl lays an egg which is "weak" also. The elaboration of the yolk and of the albumen takes place within the hen's body. These substances serve as the food of the developing embryo. It is certain from observation of both egg and chick that the same kind or quality of food is not furnished to the embryo by the egg manufactured in the body of a strong fowl as is furnished in an egg manufactured in the body of a weak fowl. This is a fact which is well known to everyone who has had experience in the hatching and rearing of poultry. To analyse all of the biological and chemical factors involved would certainly be a very difficult, indeed an almost impossible, task, yet because such analysis is not easily possible in no wise militates against the fact itself.

— Stamina and Vitality. —

Furnished with a qualitatively inadequate food supply the developing embryo either dies before hatching or hatches into a weak, debilitated chick. This badly nourished, weak chick grows into an adult fowl which is weak in constitution; usually weaker and to a greater degree lacking in vitality than the parent. The reason is that the unfavorable environment factor has had a double action upon the adult offspring. Not only did it start life as an improperly nourished weak embryo, but throughout its post-embryonic development to the adult condition the same unfavorable environment which acted adversely upon its mother has been acting upon it and undoubtedly with increased efficiency because of the initial weakness of the embryo. This offspring bird may thus be expected to produce a still less normal supply of nutriment in its eggs than did its mother, since it is less vigorous and normal than she was.

Thus the weakness is passed on from generation to generation tending all the time to become greater. I think that it must be obvious in view of these considerations than any environmental condition which is adverse to general constitutional vitality, if it is effective at all, must tend to become cumulatively so, even though every effort be made to keep environmental conditions uniform during the experiment. In fact the more uniform the environment is kept the more certainly will there be a cumulative effect of any unfavorable factor in it.

Obviously such a result as that under discussion has no real relation to the problem of the inheritance of acquired characters, though the objective result itself is precisely that which would be expected if a weakness induced by the environment were inherited. But actually the factor here dealt with is a purely nutritional one, and has nothing whatever to do with germinal constitution. This fact that any adverse environmental factor tends to produce an effect on the organism (at least among birds and mammals) which is persistent and in greater or less degree progressively cumulative, so long as the environment is kept constant and the factor continues to act, is, of course, one reason why it is so exceedingly difficult to get really critical evidence on the question of the inheritance of acquired characters.

In addition to the cumulatively adverse effect of environment as an explanation of the results of the earlier work at this Station another possible interpretation which is essential physiological in its nature occurs to one. It is that any favorable progress in the way of increasing egg production by the selection was offset in the experiment by the weakening and debilitating effect upon the birds of the inbreeding which it might be contended was practiced during the experiment.

Another suggestion which has been made is that while there was no progressive increase in egg production following the mass selection this has no bearing on the

question of the effectiveness of the selection of minute fluctuating variations because the character fecundity or egg productiveness is not inherited in the domestic fowl at all.

It is the purpose of this section to discuss the various suggestions one by one, presenting evidence which it is hoped will help to throw light on the subject.

(To be Continued).

Backyard Fowls in Summer.

There is no season of the year when fowls kept in small enclosures suffer more than they do at present.

The worst fault which people who keep backyard hens commit, whether the latter are in covered or open runs, is that of over-feeding, especially on fattening foods; and as they do not discriminate between the varying requirements of a fowl at one season or another the result is only too obvious. Supposing, for example, that the feed of household scraps and maize to be a suitable one for very cold weather, in winter, that same food would be only a little less harmful than poison if persisted in during summer. Or, on the other hand, a light diet, suitable for the hot season, would often mean semi-starvation when the weather is cold. Granted, then, that most hens in small runs are too highly fed—the food being, for the most part, a mixture of household scraps—they should at this time of year have a diet which (without going to extremes) is the antithesis of that supplied in winter.

Of course, one would never recommend the owner of the household fowls to knock off the time-honoured scraps and feed the hens on toast and water and greenstuff, but there are ways and means by which the said scraps—let them be as heating and fattening as you like—may be rendered safe and wholesome for use in the hottest season. The only ingredients of the hens' stock-pot that I would bar are potato peelings, which are unwholesome at any season owing to their poisonous nature, but any other kitchen refuse, such as bread, vegetables, meat scraps, and the like, may be turned to account if mixed with about one-third (in bulk) of good broad-flake bran. This latter is one of the finest antidotes to over-heating that the feeder can use, and if it is of the best quality, which should always be insisted on its feeding value is high. The best way to prepare a mixture of scraps and bran is to first scald as much of the latter as will be required, not making it too wet and sloppy, and then to mix the scraps with it after they have been chopped or passed through a mincer. The whole mixture should then be fairly dry and crumbly, but if at all stirky and wet a handful or so of pollard stirred into it will bring it to the desired consistency.

Apart from bran the confined fowls should have a regular supply of green food. This is always essential to health, but it is never so necessary as it is now. It does not very much matter what form it takes so long as it is wholesome. Cabbage and lettuce are, of course, both excellent, but despised weeds are as useful as green food. It is not going too far to say that if green stuff were more frequently used in poultry runs we should not hear one-tenth of the complaints which are now made against such diseases as feather-eating, "going-light," and general obesity. Green food should also, whenever possible, be given at mid-day, care always being taken to see that it is fresh and juicy. Anything of a vegetable nature left lying about to rot in the sun is exceedingly harmful, often bringing on epidemics of disease, which are not only often fatal, but most difficult to eradicate.

Sometimes it happens that there are enough house scraps to keep the fowls entirely without the addition of grain as an evening meal, but I have always found that in any cases the birds do better if allowed some hard food daily, even if it is only a handful or so scattered in the litter to promote scratching exercise. The very fact of their having something for their gizzards to grind and digest seems to promote health and vigour and to ward off that condition of slothfulness and lethargy which is the great evil all keepers of backyard hens must ever guard against.

Fowls are always thirsty creatures, but never is the water supply a more important item than it is at this season. It must not only be constant and pure, but the vessels should be placed in a shady spot and kept scrupulously clean.

Color and Flavor of Eggs.

— The Colour and Flavour of Eggs. — In some cities in both Great Britain and America, brown shelled eggs are in favour; in others white are preferred; while in a large number of places in both countries, as in Australia, so long as they are fresh and of fair size, the colour of the shell is not questioned.

Many who prefer the brown egg consider it richer than the one whose covering is white. Such is not the case; the shell has no bearing on the contents. The colour of the yolk is the best guide. A fairly dark yolk usually indicates a rich egg; a pale one a poor egg.

The flavour of the egg is governed largely by the food given to the hen. When fed largely on meat, the yolk is of a very dark colour, and strong in flavour; and when the fowls are allowed to run at large amongst rank vegetation, the yolks will also be dark. When milk is largely used in the diet, the yolk is pale, and the white watery and less firm than that laid by a hen fed on grain.

If fowls are kept in confinement, and given a good variety of cereal foods, fresh green vegetables, some meat, grit, and pure water, and get exercise by scratching for their grain in some loose material, they will lay good quality, nourishing, full-flavoured eggs.

Pieon Notes.

Victorian Notes.

(By G.J.M.)

A meeting is to be held shortly with the idea of forming a new club to watch the interests of Victorian fanciers in the show pen. Provided that such can be done without clashing with the society already established perhaps good work can be done by the new body if it really comes to light.

Several breeders report that they have had highly successful breeding seasons. But one and all complain that they have had great work in keeping down insect pests, a fact probably due to the wonderfully mild summer we have had.

Strange to say, I hear a great deal of mis-marked birds in those varieties where marking counts, but as a compensation type seems to have benefited.

Fanciers over this side regret that Mr. Fred Ball has left us for Adelaide. In the realm of Nuns and English Owls this sterling fancier made his mark, and we feel that South Australia distinctly gains where Victoria loses.

The Victorian Pigeon Society has decided to put up another Jacobin Cup in place of that won by Mr. J. J. Young a few years ago. By-the-bye, fanciers will regret to hear that Mr. Young still goes with a stick, as the result of the railway accident he was in a couple of years ago.

The Melbourne press publishes a strange story of alleged fraud in homing circles. The caper is supposed to be founded on the ability of the Adelaide express to go faster than a pigeon. Owners of birds in Ballarat and Melbourne are stated to have sent birds to homing men in Adelaide, who had them rung in for races from Melbourne or Ballarat to Adelaide. Being tossed with genuine competitors, these birds immediately homed to their Victorian lofts, where they were caught and forwarded at once by express to Adelaide to astonish club officials by their wonderful performances!

So, after all, it appears that Messrs. Bracey and Cooke used the Bagadais pigeon to improve the Magpie. This bird is really a Scandaroon, but has been bred with a straight face. It is said to have been so tall that one case was known of one that could drink out of a bucket. Already there are complaints that the Magpie is too big and too tall as a result of the cross. But give us, say, five years' breeding with the new birds, and much may be done to get rid of these faults, which, after all, are better than the short faces—and pinched at that—bumpy heads, and cobby bodies of the old type of bird. A good suggestion has been made that the Magpie should be developed as a Pigmy, a proceeding which would give a nice bird, but to my mind the taller breed would be preferable.

At Rothamsted a soil growing barley lost 9 inches more water from the top 54 inches than a corresponding bare fallow.

Home Notes.

CANNING FRUIT.

— Introduction. —

The common fruits, because of their rather low nutritive value, are not, as a rule, estimated at their real worth as food. Fruit has great dietetic value and should be used generously and wisely, both fresh and cooked. Fruits supply a variety of flavors, sugar, acids, and a necessary waste or bulky material for aiding in intestinal movement. They are generally rich in potash and soda salts and other minerals. Most fresh fruits are cooling and refreshing. The vegetable acids have a solvent power on the nutrients and are an aid to digestion when not taken in excess.

Fruit and fruit juices keep the blood in a healthy condition when the supply of fresh meat, fish, and vegetables is limited and salt or smoked meats constitute the chief elements of diet. Fresh fruit is generally more appetizing and refreshing than cooked. For this reason it is often eaten in too large quantities, and frequently when underripe or overripe; but when of good quality and eaten in moderate quantities it promotes healthy intestinal action and rarely hurts anyone.

If eaten immoderately, uncooked fruit is apt to induce intestinal disturbances. If eaten unripe, it often causes stomach and intestinal irritation; overripe, it has a tendency to ferment in the alimentary canal. Cooking changes the character and flavor of fruit, and while the product is not so cooling and refreshing as in the raw state, it can, as a rule, be eaten with less danger of causing stomach or intestinal trouble. If sugar be added to the cooked fruit, the nutritive value will be increased. A large quantity of sugar spoils the flavor of the fruit and is likely to make it less easily digested.

Nowhere is there greater need of a generous supply of fruit than on the farm, where the diet is apt to be restricted in variety because of the distance from markets. Every farmer should raise a generous supply of the kinds of fruit that can be grown in his locality. Wives and daughters on the farms should find pleasure in serving these fruits in the most healthful and tempting form. There are a large number of simple, dainty desserts that can be prepared with fruit and without much labor. Such desserts should leave the pie as an occasional luxury instead of allowing it to be considered a daily necessity.

In the season when each kind of fruit is plentiful and at its best a generous supply should be canned for the season when both fruit and fresh vegetables are scarce. A great deal of the fruit should be canned with little or no sugar, that it may be as nearly as possible in the condition of fresh fruit. This is the best condition for cooking purposes. A supply of glass jars does cost something, but that item of expense should be charged to future years, as with proper care the breaking of a jar need be a rare occurrence. If there be an abundance of grapes and small, juicy fruits, plenty of juice should be canned or bottled for refreshing drinks throughout the year. Remember that the fruit and juice are not luxuries, but an addition to the dietary that will mean better health for the members of the family and greater economy in the cost of the table.

— Fresh and Preserved Fruit for the Market. —

If the supply of fruit is greater than the family needs, it may be made a source of income by sending the fresh fruit to the market, if there is one near enough, or by preserving, canning, and making jelly for sale. To make such an enterprise a success the fruit and work must be first class. There is magic in the word "Homemade," when the product appeals to the eye and the palate; but many careless and incompetent people have found to their sorrow that this word has not magic enough to float inferior goods on the market. As a rule, large canning and preserving establishments are clean, and have the best appliances, and they employ chemists and skilled labor. The home product must be very good to compete with the attractive goods that are sent out from such establishments. Yet for first-class homemade products there is a market in all large cities. All first-class grocers have customers who purchase such goods.

To secure a market get the names of several first-class grocers in some of the large towns. Write to them asking if they would be willing to try a sample of your goods. If the answer is favorable, send samples of the articles you wish to sell. In the box with the fruit enclose a list of the articles sent and the price. Write your name and address clearly. Mail a note and a duplicate list at the time you send the box.

Fixing the price of the goods is important. Make it high enough to cover all expenses and give you a fair return for your labor. The expenses will be the fruit, sugar, fuel, jars, glasses, boxes, packing material, wear and tear of utensils, etc., transportation, and commission. The commission will probably be 20 per cent. of the selling price. It may be that a merchant will find that your prices are too high or too low for his trade, or he may wish to purchase the goods outright. In any case it is essential that you estimate the full cost of the product and the value that you place on your labor. You will then be in a position to decide if the prices offered will compensate you for the labor and expense. Do not be tempted, for the sake of a little money, to deprive your family of the fruit necessary to health and pleasure.

— Packing and Shipping. —

Each jar or jelly glass must be wrapped in several thicknesses of soft paper (newspapers will answer). Make pads of hay by spreading a thick layer between the folds of newspapers. Line the bottom and sides of the box with these pads. Pack the fruit in the padded box. Fill all the spaces between the jars with the packing material. If the box is deep and a second layer of fruit is to go in, put thick pasteboard or thin boards over the first layer and set the wrapped jars on this. Fill all the spaces and cover the top with the packing ma-

terial. Nail on the cover and mark clearly:—GLASS. THIS SIDE UP.

The great secret in packing is to fill every particle of space so that nothing can move.

— Principles of Canning and Preserving. —

In the preservation of foods by canning, preserving, etc., the most essential things in the processes are the sterilisation of the food and all the utensils and the sealing of the sterilised food to exclude all germs.

— Bacteria, Yeasts, and Fermentation. —

Over one hundred years ago Francois Appert was the first to make practical application of the method of preserving food by putting it in cans or bottles, which he hermetically sealed. He then put the full bottles or cans in water and boiled them for more or less time, depending upon the kinds of food.

In Appert's time, and, indeed, until recent years it was generally thought that the oxygen of the air caused the decomposition of food. Appert's theory was that the things essential to the preservation of food in this manner were the exclusion of air and the application of gentle heat, as in the water bath, which caused a fusion of the principal constituents and ferments in such a manner that the power of the ferments was destroyed.

The investigations of scientists, particularly of Pasteur, have shown that it is not the oxygen of the air which causes fermentation and putrefaction, but bacteria and other microscopic organisms.

Appert's theory as to the cause of the spoiling of food was incorrect, but his method of preserving it by sealing and cooking was correct, and the world owes him a debt of gratitude.

In their investigations scientists have found that if food is perfectly sterilized and the opening of the jar or bottle plugged with sterilized cotton, food will not ferment, for the bacteria and yeasts to which such changes are due cannot pass through the cotton. This method cannot be conveniently followed with large jars.

Bacteria and yeasts exist in the air, in the soil, and on all vegetable and animal substances, and even in the living body, but although of such universal occurrence, the true knowledge of their nature and economic importance has only been gained during the last forty years.

There are a great many kinds of these micro-organisms. Some do great harm, but it is thought that the greater part of them are beneficial rather than injurious.

Bacteria are one-celled and so small they can only be seen by aid of a microscope. The process of reproduction is simple and rapid. The bacterium becomes constricted, divides, and finally there are two cells instead of one. Under favorable conditions each cell divides, and so rapid is the work that it has been estimated that one bacterium may give rise, within twenty-four hours, to seventeen millions of similar organisms. The favorable conditions for growth are moisture, warmth, and proper food.

Yeasts, which are also one-celled organisms, grow less rapidly, but develops, breaks off, and forms a new yeast plant. Some yeasts and some kinds of bacteria produce spores. Spores, like the dried seeds of plants, may retain their vitality for a long time, even when exposed to conditions which kill the parent organism.

Yeasts and nearly all bacteria require oxygen, but there are species of the latter that seem to grow equally well without it, so that the exclusion of air, which, of course, contains oxygen, is not always a protection, if one of the anaerobic bacteria, as the kinds are called which do not require oxygen, is scaled in the can.

Spoiling of food is caused by the development of bacteria or yeasts. Certain chemical changes are produced as shown by gases, odors, and flavors.

Bacteria grow luxuriantly in foods containing a good deal of nitrogenous material, if warmth and moisture are present. Among foods rich in nitrogenous substances are all kinds of meat, fish, eggs, peas, beans, lentils, milk, etc. These foods are difficult to preserve on account of the omnipresent bacteria. This is seen in warm, muggy weather, when fresh meat, fish, soups, milk, etc., spoil quickly. Bacteria do not develop in substances containing a large percentage of sugar, but they grow rapidly in a suitable wet substance which contains a small percentage of sugar. Yeasts grow very readily in dilute solutions containing sugars in addition to some nitrogenous and mineral matters. Fruits are usually slightly acid and in general do not support bacterial growth, and so it comes about that canned fruits are more commonly fermented by yeasts than by bacteria.

Some vegetable foods have so much acid and so little nitrogenous substance that very few bacteria or yeasts attack them. Lemons, citrons, and rhubarb belong to this class.

Temperature is an important factor in the growth of bacteria and yeasts. There are many kinds of these organisms, and each kind grows best at a certain temperature, some at a very low one and others at one as high as 125 deg. F., or more. However, most kinds of bacteria are destroyed if exposed for ten or fifteen minutes to the temperature of boiling water (212 deg. F.); but, if the bacteria are spore producers, cooking must be continued for an hour or more to insure their complete destruction. Generally speaking, in order to kill the spores the temperature must be higher than that of boiling water, or the article to be preserved must be cooked for about two hours at a temperature of 212 deg. F., or a shorter time at a higher temperature under pressure. Yeasts and their spores are, however, more easily destroyed by heat than bacteria spores. Hence, fruits containing little nitrogenous material are more easily protected from fermentation than nitrogenous foods in which in general fermentation is caused by bacteria. Of course, it is not possible to know what kinds of organisms are in the food one is about to can or bottle; but we do know that most fruits are not favorable to the growth of bacteria, and as a rule, the yeasts which grow in fruits and fruit juice can be destroyed by cooking ten or fifteen minutes at a temperature of 212 deg. F. If no living organisms are left, and the sterilization of all appliances has been thorough, there is no reason why the fruit, if properly sealed, should not keep, with but slight change of texture or flavor, for a year or longer, although canned fruits undergo gradual change and deterioration even under the most favorable conditions.

When fruit is preserved with a large amount of sugar (a pound of sugar to a pound of fruit) it does not need to be hermetically sealed to protect it from bacteria and yeasts, because the thick, sugary syrup formed is not fa-

(Continued on page 480).

The Uses of Eggs.

There are many uses to which eggs are put besides being eaten. In many factories they are largely used, as well as in medicine for external and internal purposes. Medicinally they are seldom used in cases of fever, on account of their high nutritive value, but they are often prescribed in digestive disorders, because they pass through without tiring the organs, and furnish a restoring food. According to some physicians, there is not a more delicate, more stimulating or more easily digested food; and they are much used during convalescence, forming the transition from the broth diet to the more substantial fare. In cases of diarrhœa or dysentery. when most drinks increase the disease, whipped white of egg, mixed with water and a little sugar, is excellent to slake the thirst of the patient.

A concentrated albuminous water is made from six eggs and a quart of water, and is a remedy in some cases of poisoning.

The white of egg is used externally as a soothing medium for burns, either alone or whipped with oil. When whipped with alcohol it is used as a dressing for bed sores.

In cases of fracture, the white of egg is used for soaking the bandages, thus binding them together and promoting knitting of the fracture. The white is also largely used in clarifying liquids, and in the preparation of household cements.

The yolk of eggs also serves in a number of medicines. A Sydney medical man, in his "Book of Diet," gives the following recipe for the sick room:—

"Four tablespoonfuls of the very best brandy, the same quantity of cinnamon water, the yolk of one egg, and a quarter of an ounce of loaf sugar. Beat the yolk of egg and sugar together, and then add the cinnamon water and brandy. This brandy and egg mixture is one of the most palatable and powerful restoratives known,and often proves of incalculable benefit in debititating, exhausting, and prostrating diseases. The properly prepared cinnamon water can be readily obtained from any chemist.

"For debiltiy, exhaustion, and prostration, when a powerful stimulant is required, egg cordial is recommended, to be made as follows: Beat the white of an egg to froth, add a tablespoonful of cream and a tablespoonful of brandy."

The yolk of egg is used in some cases of cancer and dysentery, in poultices and various salves. Oil is extracted from the yolk, and is used a good deal in cold countries for chapped hands, for burns, and to prevent pox marks.

Egg Plant.

Many people do not appreciate the various ways in which this vegetable may be served. The following suggestions as to methods of cooking from "Wisconsin Horticulture," may be helpful in popularizing a really excellent vegetable.

The first and principal method of serving the vegetable is to slice it, dip the slices in eggs and crumbs, and then fry; another way is to cut the vegetable in half, parboil it, and then carefully scoop out the centre, leaving a shell an inch to an inch and a half thick to fill with the scoped-out pulp, chopped meat and bread crumbs, or pulp, nuts and bread crumbs, seasoned with salt, pepper, sage, thyme, parsley, bay leaf, butter, tomato catchup, then baked or roasted until brown, serving as mock duck; or a third way is to cut the fruit in dice, then scallop with bread crumbs and butter.

Storing Vegetables.

The homemaker who is so fortunate as to possess a cool dry cellar has a means of economy at hand denied to many. A cool cellar enables one, writes an American paper, to lay in winter supplies of fruit and vegetables when harvested and prices are low. It is advisable when planning to allow somewhat more than is needed so as to balance possible loss by evaporation and decay, but the class of housekeeper here in mind are those who are saving what they may from the crops of their own little home gardens. Some time before harvest it is best to lay in a load of clean fine sand, so that it will be thoroughly clean when needed, also if bins have not been provided, a good supply of empty wood boxes. When ready dig potatoes, turnips, carrots, beets, parsnips, onions, and pull cabbage, squash, egg plant, etc., to store as follows:

Turnips, carrots, beets, and parsnips in boxes, by packing in layers of sand; keep well aired, cool and dark.

Potatoes in sacks or boxes in dark, cool and dry place.

A good plan is to put a layer one or two inches deep of sand in the bottom of a box, then lay in orderly rows a layer of vegetables on which is sifted enough sand to fill all interstices and make a layer an inch or more thick between the vegetable layers. Fresh sand should be obtained each year, as experience shows that the sand becomes contaminated by the germs of decay and infects a second year's crop.

Onions should be dried somewhat before being put in bags or boxes.

Squashes need simply to be kept dry and from freezing.

Cabbages may each be wrapped in newspapers and stored on shelves, or hung to rafters of cellar by roots.

Egg plants should have the stems paraffined and then be wrapped in paper.

A Pickle.

Chop green tomatoes and sprinkle with salt, let stand overnight and drain thoroughly. There should be two quarts after draining. Then add two quarts of chopped cabbage, one pint onions sliced thin, one pint chopped celery, two large red peppers chopped without seeds, one-half cup each of salt and mustard seed, two tablespoonfuls of celery seed, and vinegar to cover. Pack in a crock or jars and cover. No cooking.

An American Recipe.

A Cucumber Salad Pickle.

12 table sized cucumbers sliced thin (⅛ inch).

5 onions sliced thin.

Cover with one-half cup of salt; let stand 2-3 hours, then drain.

Add 1 rounding tablespoonful of celery seed.

½ cup white mustard seed.

1 pint (more if needed to cover) Seppelt's vinegar.

½ cup olive oil (olive oil should cover top to exclude air).

Keep in crock or fruit jars in the dark. Olive oil quickly becomes rancid if exposed to light.

Hints.

Soak lamp wicks in vinegar, and allow them to dry before using, and you will find that the lamp chimneys will not become smoked.

To remove grease from carpets, make paste of fuller's earth and ammonia. Spread over the marks and leave til dry. Then sweep in the ordinary way.

Hang brushes by loops of wire instead of string. The wire will be found an improvement, as it is easier to slip on and off a hook and does not twist or wear out.

When enamel becomes discoloured, scour it with a damp flannel dipped in whiting, rinse it well, and rub dry with a leather. This cleans it without scratching the enamel.

When baking potatoes, grease them first with a little butter, and, when cooked they will be beautifully brown and crisp, with the glazed appearance that makes them so appetising.

A quick way of making breadcrumbs is to put the crumb from a stale loaf into a muslin bag, tie at the top, and then rub gently between the two hands for a few minutes. The crumbs will then be fine enough for any purpose.

When a japanned tray becomes old and chipped, give it two coats of white paint and one of enamel, the bottom as well as the top. Stand it on the edge to dry after each coat. It will be as good as new, as well as very pretty. The enamel is easily renewed.

Calico shrinks in washing, therefore allow three-quarters of an inch on every yard.

Cut flowers will keep fresh longer if a small piece of saltpetre be put into the water.

To polish aluminium, make a mixture of borax, ammonia, and water. Apply with a soft cloth.

Metal kitchen spoons should be washed to get rid of the grease, and then scoured with salt and sand.

Scrubbing brushes if hung in the air will last twice as long as they would if allowed to lie in a damp place.

Steel that is exposed to damp may be kept from rusting by the application of a good coat of copal varnish.

When sticking labels to canisters add a little honey to the flour and water paste, and then the paper will not peel off.

A tear in the dress should be darned as near as possible like the weave of the cloth with a thread of the material itself.

If you want your pastry to be light use a knife for mixing it instead of a spoon, and touch it with the hands as little as possible.

Water bottles may be cleaned with salt and vinegar. A dessertspoonful of salt moistened with vinegar. Shake until stains are removed.

Readers! Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

(Continued from page 477).

the self-sealing jars are much better vorable to their growth. However, than keeping such fruit in large receptacles, from which it is taken as needed, because molds grow freely on moist, sugary substances exposed to the air.

— Molds and Molding. —

Every householder is familiar with molds which, under favorable conditions of warmth and moisture, grow upon almost any kind of organic material. This is seen in damp, warm weather, when molds form in a short time on all sorts of starchy foods, such as boiled potatoes, bread, mush, etc., as well as fresh, canned, and preserved fruits.

Molds develop from spores which are always floating about in the air When a spore falls upon a substance, it branches and works its way over and into the attacked substance. In a short time spores are produced and the work of reproduction goes on.

In the first stages molds are white or light gray and hardly noticeable; but when spores develop the growth gradually becomes colored. In fact, the conditions of advanced growth might be likened to those of a flower garden. The threads—mycelium—might be likened to the roots of plants, and the spores to the flower and seeds.

Mold spores are very light and are blown about by the wind. They are a little heavier than air, and drop on shelves, tables, and floor, and are easily set in motion again by the movement of a brush, duster, etc. If one of these spores drops on a jar of preserves or a tumbler of jelly, it will germinate if there be warmth and moisture enough in the storeroom. Molds do not ordinarily cause fermentation of canned foods, although they are the common cause of the decay of raw fruits. They are not as injurious to canned goods as are bacteria and yeasts. They do not penetrate deeply into preserves or jellies, or into liquids or semi-liquids, but if given time they will at ordinary room temperature, work all through suitable solid substances which contain moisture. Nearly every housekeeper has seen this in the molding of a loaf of bread or cake.

In the work of canning, preserving, and jelly making it is important that the food shall be protcted from the growth of molds as well as the growth of yeasts and bacteria.

To kill mold spores food must be exposed to a temperature of from 150 deg. F. to 212 deg. F. After this it should be kept in a cool, dry place and covered carefully that no floating spore can find lodgment on its surface.

— Sterilization. —

To sterilize a substance or thing is to destroy all life and sources of life in and about it. In following the brief outline of the structure and work of bacteria, yeasts, and molds, it has been seen that damage to fods comes through the growth of these organisms on or in the food; also that if such organisms are exposed to a temperature of 212 deg. F., life will be destroyed, but that spores and a few resisting bacteria are not destroyed at a temperature of 212 deg. F., unless exposed to it for two or more hours.

Bacteria and yeasts, which are intimately mixed with food, are not as easily destroyed as are those on smooth surfaces, such as the utensils and jars employed in the preparation of the food.

Since air and water, as well as the foods, contain bacteria and yeasts, and may contain mold spores, all utensils used in the process of preserving foods are liable to be contaminated with these organisms. For this reason all appliances, as well as the food, must be sterilized.

Stewpans, spoons, strainers, etc., may be put on the fire in cold or boiling water and boiled ten or fifteen minutes. Tumblers, bottles, glass jars, and covers should be put in cold water and heated gradually to the boiling point, and then boiled for ten or fifteen minutes. The jars must be taken one at a time from the boiling water at the moment they are to be filled with the boiling food. The work should be done in a well swept and dusted room, and the clothing of the workers and the towels used should be clean. The food to be sterilized should be perfectly sound and clean.

In canning fruits it is well to remember that the product is more satisfactory if heated gradually to the boiling point and then cooked the given time.

— Utensils Needed for Canning and Preserving. —

In preserving, canning, and jelly making iron or tin utensils should never be used. The fruit acids attack these metals and so give a bad color and metallic taste to the products. The preserving kettles should be porcelain lined, enameled, or of a metal that will not form troublesome chemical combinations with fruit juices. The kettles should be broad rather than deep, as the fruit should not be cooked in deep layers. Nearly all the necessary utensils may be found in some ware not subject to chemical action. A list of the most essential articles follows:—

Two preserving kettles, 1 colander, 1 fine strainer, 1 skimmer, 1 ladle, 1 large-mouthed funnel, 1 wire frying-basket, 1 wire sieve, 4 long-handled wooden spoons, 1 wooden masher, a few large pans, knives for paring fruit (plated if possible), flat-bottomed clothes, boiler, wooden or willow rack to put in the bottom of the boiler, iron tripod or ring, squares of cheesecloth. In addition, it would be well to have a flannel straining bag, a frame on which to hang the bag, a syrup gauge and a glass cylinder, a fruit pricker, and plenty of clean towels.

The regular kitchen pans will answer for holding and washing the fruit. Mixing bowls and stone crocks can be used for holding the fruit juice and pared fruit. When fruit is to be plunged into boiling water for a few minutes before paring, the ordinary stewpans may be employed for this purpose.

Scales are a desirable article in every kitchen, as weighing is much more accurate than the ordinary measuring. But, knowing that a large percentage of the housekeepers do not possess scales, it has seemed wise to give all the rules in measure rather than weight.

If canning is done by the oven process, a large sheet of asbestos, for the bottom of the oven, will prevent the cracking of jars.

Constable :—Knocked down by a motor car, were you ? Did you take the number of the car ? Victim : No ; it was going too fast. Constable : Could you swear to the driver ? Victim : I did.

Editorial Notices.

ɜENTS.—Messrs. ATKINSON & CO. MESSRS. GORDON & GOTCH, Ltd.

ıe Editor will be pleased to receive ·espondence and answer questions. se replies will, for the most part, be : by mail, unless received just prior date of publication.

UBLISHING DATE.—On the 25th of ı month preceding title date.

ISCONTINUANCES.—Responsible sub- bers will continue to receive this rnal until we are notified by letter to :ontinue, when all arrears must be d.

O ADVERTISERS.—Alteration of ad- tisements should be in our hands not er than the 15th of the month.

UBSCRIPTION.—Posted to any part Australasia 5/- per year, in advance. ·eign, 6/.

.DDRESS—85, Currie St., Adelaide ephone, 1234.

Open Border Notes.

Thanks probably to Mr. Wragge's cturesquely named Pluto, early wn and planted seedlings have .d a less trying time than is ısually the case during March. ıis the gardener has shared, for : has been less tied to the end a hose, a position which, at the ıd of three or four months' pretty renuous apprenticeship, he very ıturally abhors. If Agamemnon ɔmes along as promised (he or i appears to be a bit shy of ɔing so at present) and brings a ɔuple of inches of rain amongst ıe variegated assortment of wea- ıer promised by that quaintly un- rthodox prophet, our gardens ill soon be in good condition for orking and no time should be st in making full sowings of all ıe varieties of hardy annuals which there are very long lists gardening books and seedsmen's ıtalogues. The number is so reat that it is confusing to the mateur. At the same time a ıort list is sure to omit some- ıing of interest. It is safe, how- ver, to say that almost every ɔrt of seed except the tender nnuals may with perfect safety grown now; whether the sow- ıg be made in the open beds or ı seed beds or frames.

The following is a list, quite ng enough for most amateurs hen their own special favorite utsiders are added: — Alyssum, nemone, annual chrysanthemu , ıtirrhinium (snapdragon), aquile- ia, ornamental beet, calendula, narigold), calliopsis, cyclamen, allistemons (China aster), candy- ıft, carnation, chrysanthemum, neraria, clarkia, cornflower, cow- ip, daisy, delphinium, dianthus ɔinks), digitalis (foxglove), gaillardia, ornamental grasses, heliotrope, hollyhock, honesty, iberis (candytuft), larkspur, lavender, linaria, linum (flax), lobelia, linaria, lupins, mesembryanthemum, mignonette, mimulus, musk, myosotis (forget-me-not), nemesia, nasturtiums, pansy, penstemon, phlox, polyanthus, petunia, poppy, primrose, primula, pyrethum, ranunculas, schizanthus, Sturt's pea, sweet peas, sweet william, verbena, veronica, violet, Virginian stock, wallflower, or seedlings of many of them may be procured from the nurserymen.

Many summer-growing annuals are now at their best, and no pains should be spared to maintain their beauty. Our former warnings about keeping old dead blooms cut away will bear repeating. The heavy gorgeous foliage of amaranthus should be supported by stakes, otherwise they will bend down and their beauty be concealed. Any zinnias that may have decayed early, or the foliage become unsightly, must be pulled out at once. The flower heads should be constantly pinched out of pyrethrum edgings. Alyssums should be clipped hard back where flowering has ceased. Carpet designs, of alternantheras, iresines, etc., should be gone over occasionally and straggling shoots pinched off.

Now is the best time to begin to lay out new gardens. This work is often delayed until the ground becomes sodden or sticky, which renders the work difficult and distasteful. It is not necessary, and it is very bad policy, to wait for the ground to be in a condition to receive the plants, trees, etc., before shaping the borders.

Growths coming from the budded roses should be supported or nipped back, otherwise the "eyes" may be blown out entirely and the scion be lost.

Keep dahlias, cannas, gladioli, and chrysanthemums securely tied to stakes, and where practicable give liquid manure twice a week.

Chrysanthemums grown in the ordinary way may be made to produce much finer blooms if many of the top buds and all the side shoots be removed.

The planting out of seedlings that are ready in the seed-boxes well started, should be done at every favorable opportunity. If they are in before the rain comes they are not so prone to be destroyed by the slugs that come with the first showers.

It is said that plants that have been watered with sulphate of ammonia as a liquid manure are less liable to be attacked by the slugs.

Cuttings of all such plants as pelargoniums, carnations, fuchsias, penstemons, etc., may be put in now, but if you are going to strike them in the open garden it would be better to wait for the first rains. If put in now the beds are likely to become dry, and this will assuredly kill all the cuttings.

If you are fond of Ranunculus and anemone you can quickly get a collection by planting the seed now. It readily germinates, and will flower the first season.

Edging plants must now be attended to. Where the edge has failed the vacant space should be filled in as soon as possible with fresh plants or cuttings. Lemon-scented thyme, Pyrethrum, or golden-feather, box, lobelia, pansy,

daisy, sweet william, and alyssum, are all good for this purpose.

Many of the perennials are best taken up and divided now, and only small pieces replanted. If this is not done the flowers get smaller and smaller each succeeding year, and become useless.

The verbenas, if cut back and well watered, will give an abundance of bloom in a fortnight's time. These old favorites make a grand show if they have a bed to themselves. They like and will nobly respond to an occasional application of liquid manure.

A sharp look out must be kept on the roses to note the first appearance of the aphis. If not attended to at once this pest quickly multiplies, thus increasing the work of destroying it a hundredfold. A solution of Gishurst's compound will be found effectual in destroying them.

Cinerarias that are planted out will be benefited by a daily watering over the foliage with rain water.

Give the roses a weekly application of weak liquid manure. Remove shoots from the briar.

Cosmos that are not well protected from the wind should be tied to stakes or they will be broken down.

If care is used in collecting, it is as well to save your own seed. By care, I mean care in selecting only the best flower heads. To do this a piece of colored woold should be tied on the best flowers, and only the seed from these gathered. It will be best kept in seed-envelopes, which can be procured very cheaply. The name of the seed, color, etc., should be plainly written on the envelope.

Now and for the next two months is the time to decide whether you will have your garden weedy or not during the winter. If you will recall past experience you will find that the same general rule holds good with the weeds as with the annual flowering plants; in fact, a weed is only a plant out of place. With the first good rains the weeds commence to grow, and thousands of tiny plants will cover the ground. They are then very easy to destroy, but if left a while will take deep root and give trouble. So keep the hoe going.

— Bouvardias. —

Now is the best time for planting these beautiful dwarf plants out in the open border. A specimen should be in every garden, for they bloom profusely during the year, and some even during the winter. They are in great demand for bouquets, the colors varying from pure white to the deepest crimson, same of them being highly perfumed.

They are extremely hardy, and will do well if put out at the right time; that is to say, now, before the ground has become too cold. Nearly all the failures to get this plant to succeed on the plains have been caused by neglect of this point, the plants having been put out during the winter. During summer they should be mulched and regularly watered, and occasionally given some weak liquid manure, and with this treatment they will repay the grower with an abundance of bloom.

— Violets. —

These are best taken up each year and divided, or the flowers deteriorate, getting smaller and smaller. Select a position that is warm and sheltered during the winter season. Dig deeply (trenching it would be best); and thoroughly mix with the soil a quantity of leaf mould, or even leaves that have not rotted. The plants should be divided carefully, doing as little damage as possible to the roots, and put them out about a foot apart. To obtain the greatest amount of success, the side shoots and runners must be removed as they appear, the surface of the bed kept well stirred with the hoe, and the ground never allowed to become dry. They are so hardy that no one thinks of giving them any special culture, but attention to the above 'points will produce flowers vastly superior to the ordinary bloom produced without cultivation.

— Mignonette. —

Mignonette is always appreciated, and more so in the early spring. But although not difficult to manage, many fail with it. The seeds can be sown now, using shallow boxes, or can be sown where the plants are to flower. They should be well covered with fine soil, and given a good watering. Good loam, rotted stable manure, old lime rubbish, suits it. Firm planting is one of the greatest points in the successful culture of Mignonette. When first planted out they may require a little shade. When once a good start is made the chief thing is watering, as the slightest neglect may prove fatal if allowed to get too dry. Liquid manure may be used freely, starting with it at a moderate strength, when the plants are about four inches high. It is safe to start with manure quite early, and keep it up regularly. It should be made some time before using, so that it may settle down and be used in a clear state.

Plenty of air and full exposure to the sun will ensure short, stocky growth, and good spikes of bloom.

— Roses. —

As soon as possible get any position where you are going to put in roses ready for the plants which you will be wise to order early. Dig the ground deeply. It is best to go over the whole area to be planted than just to take out the necessary holes. Be liberal with bonedust and old rotted manure. Roses will stand a lot of strength in the ground. We recently read a suggestive list of "dont's" for rosegrowers, which we pass on. Don't forget to place your orders early for trees for planting. Don't forget to thoroughly prepare the ground before planting. Don't plant Roses when the soil is in a sodden state. Don't bundle the roots together and don't forget to put down your foot firmly, using the wood in its literal sense, at planting time. Don't allow the roots of the new-planted Roses to by much disturbed by strong winds. Don't spare the tree and spoil the Roses at pruning time. Don't forget occasionally to put your ideas to the test of experiment. Don't forget to look out closely for aphis. Don't worry about the exact class to which Roses belong; they are all beautiful.

— Good Climbers. —

There are many good climbers, though perhaps the gardeners' requirements are not quite as well filled in this class as in most others. For present planting Cobea scandens, with its elegant flowers and fine foliage and the well known Bougainvilleas must not be forgotten, they both like to make a start whilst the weather is warm. The latter subject, by the way, is rather a trying plant in a small garden, for the vivid colouring certainly has a rather killing effect. Writing of colour reminds us that if brilliant primary colours are to be used with artistic effect, the following rules are worth remembering:—Keep scarlet away from another scarlet of a different tint, and from pinks and reds or bronzes; yellow should be kept away from another yellow which is less strong. Blue and purple do not combine. With a little care and forethought the amateur can soon tell when colours do not combine. The neglect of such simple hints is to be regretted, seeing that such lovely combinations are possible.

Renovating Herbaceous Borders.

There are times when it is not convenient to replant herbaceous beds and borders, but when this is so some renovation should take place and stimulating food be provided for the occupants. Free-growing subjects are soil-exhausting, and quickly become weak if not fed. When a border is replanted, the weakening of the centre of each clump is avoided; but where replanting the whole is not convenient, then renovation must be resorted to. To do justice to the plants, so that the border as a whole does not suffer, some of the weaker plants should be replanted. Choose a few vigorous root-growths from the outer portions of each. Before replanting, remove the soil 1 foot deep and as wide, assuming, of course, that the same subject is to occupy the same site; but if not, there will be no occasion to remove the soil. Replace the old soil with fresh. If not convenient to bring in quite new soil to the border, take some from the surface close by, replacing it with that removed from the site, adding a fourth part of manure in a decayed state. The whole of the border should be forked over between the clumps—quite lightly, of course, near the plants, so as to avoid disturbing the roots too much. Where space exists between the plants, dig the soil over deeply. As the work proceeds, bury a quantity of half-decayed stable manure near such plants, as they are voracious feeders, and unless constant stimulants are applied, the growth becomes weak, and, naturally, a poor flower crop is the result.

One great fault made in the cultivation of herbaceous plants is that c allowing each specimen to grow to an unwieldy size. It is not an uncommon sight to see clumps of perennials fully a yard across at the base, with stems half the strength they should be. Supporting the stems of such clumps as these is a difficult matter The result is they are too often tied in close together, resembling a tightly-bound broom; the natural beauty of the plant is lost and the centre of the plant quite prevented from making a free development, whereas smaller plants can easily be kept in an upright position by the aid of one or two stakes and loose ties. Instead of retaining clumps of the larger size, it is better to reduce them to 6 inches, retaining the outer portion, filling up the space with half rotted manure and fresh soil, which will invigorate the plant retained.

Bulbs for Planting Now.

The growing of bulbs is not attended with much trouble when once the ground has been adapted to suit their peculiar nature, which, indeed, in many cases, requires no addition to the ordinary soil, except sand. Sand is the principal ingredient required in most cases for the cultivation of bulbs, and good river sand is the best. This should be well mixed with the soil to a considerable depth, as the feeders of a good many bulbs go down deeply.

It will be found more convenient, and at the same time set the plants off to better advantage if they are planted in bed or beds by themselves. The beds should be protected from the wind, especially on the south side.

If it is intended to set a part of the garden entirely apart for the cultivation of these plants, and form what is commonly known as a "Dutch Garden," the design will be materially improved by planting pillar and climbing roses round it. The roses will form one of the prettiest imaginable borders and give great additional effect.

— The Ranunculus. —

Scarcely anything in flower culture can well be compared to a large bed of well-grown ranunculi; their variety of color is so exquisite and diversified. The bed should be prepared some little time before the roots are planted. Thoroughly mix with the soil some rotten cow manure and river sand. Turn the bed over two or three times, and make the surface moderately fine. Plant the corms in rows six inches apart and four inches apart in the rows. When planting press the tuber into the ground so that the crown is an inch and a half below the surface of the bed. After the whole bed is set the surface must be raked fine and level. The tubers should be taken up when they are ripe, dried, and stored away until the following season. The ranunculus may be raised in abundance from seed.

— The Anemone. —

The cultivation of this is very similar to that of the ranunculus, except in one particular. I have found that if dung be mixed with the soil they are to grow in they are apt to produce too much leaf and not enough flower, and I am convinced that the anemone will do best in a good garden loam mixed with road sand, but no dung. When planting the root should be pushed into the soil (as was done with the ranunculus), so that the crown is an inch or so below the surface.

This, like the ranunculus, is easily raised from seed.

— The Hyacinth. —

When you consider the peculiar qualities of the hyacinth, which place it pre-eminently in advance of every variety of bulb, one cannot help wondering why we so seldom see beds of this plant in our gardens. It accommodates itself to every kind of garden by its dwarf habit, and by the profusion of its flowers, in which are found every shade of color, and, above all, by its matchless fragrance, which alone should give it a place in the beds nearest the dwelling house. The cultivation of the hyacinth is as simple as that of the ranunculus. The soil must be composed of good garden loam, having thoroughly mixed with it a proportion of old rotted dung and road sand. The bed must be dug deeply, 18ins. being not too deep. The bulbs should be planted in rows about 6 or 7 in. apart, and about 6 in. apart in the rows. When planted the top of the bulb should be about 3 in. below the surfare.

The hyacinth is multiplied by seed off-sets.

When the flower spike is nearly full-grown liquid manure may be given once, but only once. This must be done so as to reach completely down to the feeders, or the plants will get little benefit from it. One ounce of guano to a gallon of water is about the best for them.

— The Daffodil, or Narcissus. —

These are very desirable as bedding plants. They are all possessed of fragrance, and some of them highly so. Another point in their favor is their earliness. They are of easy culture. Any good, deep-dug soil suits them, and almost any situation. There is one great objection to this plant as a permanent bedder, namely, the length of time during the year the beds are without bloom, but this may to some extent be remedied by planting a gladiolus between each bulb, and if they are fed once or twice with a weak liquid manure, such as an ounce of guano to a gallon of water, they will do well, and neither will suffer from want, or a carpet of forget-me-not, mignonette, etc., may be used, to be followed by portulacca, or similar plant.

— The Sparaxis and Ixia. —

The cultivation of both these showy bulbs is similar. Good

garden loam mixed with some road sand will answer well for them. Plant them in rows 4ins. apart and about 3ins. deep. This is a most desirable class of plants, both because of their diversity of color and because they last so well when picked.

A couple of soakings of half an ounce of guano to a gallon of water, given as soon as the flower spike has formed the buds, will greatly benefit them.

— The Gladiolus. —

Considering the many good qualities of this bulbous flower, its exquisite beauty and the fulness of its flowers, together with its unusual duration, both on the stem and in water, the gladiolus is pre-eminently a flower suited to all kinds of gardens. The bulbs are cheap and the cultivation easy. It can be planted at fortnightly intervals for the greater part of the year. Mix with the soil a quantity of old rotted cow manure and sand, and plant about 5in. below the surface. They are multiplied by seeds and off-sets. When the bulbs are taken up for their periodical rest the small bulbs should be carefully removed and planted in a bed by themselves, and will form good flowering roots in two or three years.

— The Iris. —

Of the iris there are the English, German, Spanish, and Japanese varieties. They are not really bulbs at all, but may be included here for convenience. They grow from a rhizome, or bulbous root stalk. Let the soil be dug deeply, a foot or more, and thoroughly mix with it some dung, sand, and the scrapings from under a hedge or under some old trees. Plant the bulbs in rows, 6ins. apart and 6 ins. apart in the rows, and about 5ins. deep. The herbaceous kinds may remain two or three years where planted, and they prefer a rather stiff soil. The flowers of all of them will be improved by one or two waterings with liquid manure, say two ounces of guano to a gallon of water, which must be given as soon as the flower buds show themselves.

There are several other bulbous plants that might be added, such as the arum (or Nile lily), babiana, tritonia, crocus, snowdrop, oxalis, and the tulip; but those I have treated of are the chief, and form a sufficient variety for the ordinary garden. An objection has often been raised to the cultivation of bulbs that the beds are a desert for a great part of the year. This drawback may be diminished by planting out phlox, stock, or other suitable annuals, on the surface of those beds, where the bulbs are to remain some years.

Wire Weed.

A procumbent annual. Stem long, straggling, much-branched, with numerous joints, often swollen, hence the name of "knot-grass." Leaves small and narrow, sometimes pointed and sometimes rounded. Flowers small, pinkish-white, borne in clusters in the axils of the leaves. The small sheathing stipules are red.

This plant well deserves the name of wire-weed, being tough and hard to cut with ordinary garden tools, the straggling stems wandering in all directions, tangling and matting everything together in such a manner as to render removal difficult without serious damage to the plants amongst which it is growing. A single plant will frequently cover a patch several feet in diameter. It is a nuisance alike to the gardener, the farmer, and the grazier. Very common by roadsides and in waste places generally, besides being found many miles from civilisation.

The prostrate spreading habit of P. aviculare enables it to cover a large area, and thus occupy much space which should be devoted to more useful vegetation. The matting enables it to smother and kill out many rivals. Where circumstances demand or the soil is very rich, the wire-weed sometimes assumes a semi-erect growth, and in such cases is not so tough or so difficult to get rid of.

In England and America the knot-grass is frequently called "red-shank," from the color of the sheathing stipules; the same name is also applied to another species of Polygonum. Other common names are also given; for instance, "hog-weed," because, it is said, pigs are fond of it. The Japanese prepare a blue dye from P. aviculare.—"Kirk."

The Propagation of Lilies.

The Lilies, or, to give them their correct botanical name, Liliums, are for several reasons particularly suited for amateurs and beginners in horticulture. By far the greater number of kinds are perfectly hardy. Their propagation is in reality an easy matter. For raising seedlnigs or growing bulbils in a small state a cold frame is useful, but by no means a necessity.

— Sowing Seeds. —

There are several methods of increase—by seeds, scales, bulbils, and offsets, or by division. So wthe seeds as soon as ripe, or when they come to hand, in well-drained pans or pots filled with light, sandy soil. Scatter the seeds thinly over the surface and just cover with a mixture of sand and fine soil. Place the pans or pots in a cold frame or plunge them to the rims in ashes, choosing a sheltered position protected from the sun and cold winds. The thin, grass-like growths of the lilies may show above the soil in some instances in four or five weeks, others will take a little longer. One or two lilies are very erratic in their period of germination. Seeds of L. giganteum, for instance, if soon as soon as ripe, sometimes come up readily, while if stored they will not germinate for a year, or even two years, the seeds, though quite good, lying dormant in the soil.

— Pricking off Seedlings. —

When a couple of inches high, pricking-off about one and a half inches apart to other pans or shallow boxes will be desirable. Prepare light, sandy soil for the seedlings, made up of equal parts loam, peat, leaf-mould, and coarse sand. If no peat is at hand, use two parts leaf-mould. Return again to the cold frame, or plunge in ashes outside as before. When plunged outside, the pans should be protected from frost, and a light roofing is desirable over the pans to throw off excessive moisture when the tiny lilies are resting. The next move for the seedlings will be a prepared bed of light, sandy soil in the garden. Some of the plants flower the second year from seeds, notably L. tenuifolium. The third and fourth years will see practically all in flower except, perhaps, L. giganteum, which may take a year, or even two years longer, but when it does flower, pushing up its huge spike 6 feet, 8 feet or more high, it is worth all the waiting.

— Increasing by Scale Leaves. —

The scale leaves of the bulbs are sown thinly on the surface of pans in the same way as seeds and nearly covered with coarse sand. In due time tiny bulbils develop at the base of the scale leaves. These push up thin grass-like leaves, and the subsequent treatment is then the same as for the seedlings. The scale leaves are obtained from the outsides of the old bulbs, a dozen or more from each. Too many must not, of course, be removed, or the parent bulb will be injured.

— Propagation by Bulbils. —

Bulbils are formed in the axils of the leaves on the stems of several species, the best-known being L. tigrinum. Some lilies develop bulbils, or tiny bulbs, near the base of the stem above the bulb. Instances of this are L. Henryi and L. longifiorum. The bulbils should be detached from the stems in autumn and dibbled in boxes or pans of sandy soil, as recommended for pricking-off seedlings. Bulbils flower in about two years.

— By Division. —

The division or parting of lily bulbs in autumn or spring is the most common method of increase. The fact that there are several bulbs in a cluster beneath the ground is apparent when several flower-stems come up from the clump in close proximity. All that is necessary is to lift the clumps, divide them up as much as possible, and re-plant. A thin layer of sand placed below and above the bulbs is a useful protection from excessive moisture in heavy soils.

Hollow Trees.

There is no doubt that hollow places in the trunks and limbs of trees formed by decay are better filled up. If the cavity be a large one the appearance of the trunk is thereby improved, and if it be small and properly treated decay is often arrested and new bark encouraged to grow over the filled up cavity. It prevents the entrance and accumulation of moisture, and thereby removes one of the chief predisposing conditions of decay.

The majority of such decayed hollows have their origin in snags left by branches broken off that have rotted back into the trunk because the new bark has not been able to grow over and seal up the wound. Branches removed by design, or broken off by wind or accident, should always be sawn off close to the trunk, and the sawn surface should then be coated over with ordinary coal tar. Ifa snag or stump is left the bark cannot grow over it; damp, fungoid parasites and decay sooner or later

follow, and gradually find their way towards and eventually into the trunk. Such is the most frequent beginning of cavities in the limbs and trunks of trees. The coating of tar renewed every two or three years, makes the wound watertight and fungus-proof; its object being to serve as a temporary bark until a new natural covering is formed. It is certain that the life of many trees, historically famous or otherwise notable, might be much prolonged if a close watch against the intrusion of decay into the trunks and main branches was maintained.

With regard to hollows that have already formed, the following treatment is recommended:—First clean out all the decayed materials, especially the soft brown crumbling wood and the soppy masses frequently found at the bottom. Sound dead wood that has become dry and hard does not matter. Then wash the surface of the wood that is left exposed with a strong solution of carbolic acid. After allowing this a day or two to dry, a good thick coating of ordinary tar should be laid on. This antiseptic treatment is intended to destroy as far as possible fungoid parasitees. It now remains to fill up the cavity. If this be a small one Portland cement may be used, and for round holes like those made by wood-peckers a plug of oak cut to fit will do. But if the hollow be a large one, the aid of the bricklayer may be obtained.

These, however, are mere refinements. The chief points are, the keeping out of moisture and the provision of a surface over which the new bark may grow. If a tree is in a state of vigorous growth, as many hollow trees are, the bark will in time close over the "stopping." But unless some surface is provided on which the new wood can set itself it forms thickened rolls. In very hollow trees open on one side a curious spiral growth of wood is sometimes seen in place of these thickened rolls, which is due to the new wood continually being deposited on its own inner surface. A remarkable example of this curious growth is exhibited in No. IV. Museum at Kew, presented by Lord Iveagh. It is a section of elm trunk that was so hollow as to be merely a shell a few inches thick. On one side of the trunk was a longitudinal slit. The tree appears to have a good growth and to have made vigorous efforts to close up the opening, but having no surface on which to deposit the new wood and bark and thus bridge over the gap between the two lips, it eventually formed by its continual growth on the inner side two remarkable spirals suggesting a pair of scrolls.—"Kew Bulletin."

The Water Lily of Brazil.

VICTORIA REGIA ON THE AMAZON.

(From "The Garden")

The famous water lily, Victoria regia, which is now grown at Kew, Chatsworth, and elsewhere in England, has only been known to botanists for a little over 100 years. Originally discovered by Haenke in 1801, no specimens were seen in Europe until 1828, when some were sent to Paris by D'Orbigny, who had found the plant in the River Parana in Guiana. There it was known to the Indians by the name of irupe, a word signifying a dish, in allusion to the shape of the leaves. In 1832 the lily was discovered in the Amazon, but it was not until Sir Robert Schomburgk found the plant on the Berbice River in British Guiana in 1837 that it became known generally to Europeans. Though the plant is familiar to those who know the Botanical Gardens at Kew, it is interesting to note that it is by no means easily accessible in its native lands. This fact induced the writer to undertake a small botanical excursion in search of the plant at the junction of the Rivers Amazon and Negro in Brazil, where, amongst other places, it is to be found.

The waters of the Rio Negro had fallen some 10 ft., the stems of the submerged palms were reappearing from the inky waters which had covered them for the past two months, and every circumstance seemed to favor the idea that a good opportunity had arrived for endeavoring to reach the pool where these famous water lilies flourished.

Manaos lies a few miles above the junction of the Amazon and Rio Negro, and although it was said that in the lakes lying in the swampy ground, intersected by natural canals between the two great rivers, these lilies grew, yet it was only with the greatest difficulty that any precise information could be got about them. The rise and fall of the Rio Negro is about 60 ft., and only at certain heights of the water can the lake between this river and the Amazon be reached.

— Journey up the River. —

Early in the morning the steam launch I had borrowed came round. The surface of the still backwater was covered with thick white mist, curling slowly round the palms and rolling past the steep sides of the bank opposite. Soon, however, the intense heat of the sun dispersed the cool mist wreaths, and a mile or two down the stream everything was as clear as could be. Steaming quickly down with the current, the meeting of the black waters of the Rio Negro and the milky waters of the Amazon could be seen ahead, a very clear line marking the junction of the two rivers. Leaving behind the rose-red precipitous banks of the Rio Negro, the launch turned and steamed up the low wooded reaches of the Amazon. The scenery was curiously English; groups of round-headed trees rose from what looked like meadow lands, palms and the thick tropical tangle of brushwood being quite absent. A cry was raised of "Jacare, jacare!"—"Crocodile, crocodile!"—and a little way in front was seen what seemed like one swimming rapidly along. It did not dive as we swung round and stopped the engines, and it turned out to be a huge chameleon swimming across the river, and very tired by its long journey. With difficulty willing knives and revolvers were stayed, an arm stretched out, and, to the mingled horror and admiration of the crew, the chameleon grasped it, and was safely brought on board, where it was secured by a cleverly tide noose. This animal is now thriving in the reptile house of the Zoological Gardens.

Steaming along between islands, the launch turned up a natural canal, which soon narrowed so much as to make navigation a difficulty. The forest thickened; monkeys could be heard chattering overhead; white egrets rose and flapped slowly away, and numbers of metallic-plumaged birds flew ahead for a few yards until again put up by our approach. Both banks of the passage were covered with a bright green grass growing in the water, so that much care had to be exercised to prevent the propeller getting hopelessly entangled. An enormous crocodile was basking on the water in front, but the thud-thud of our approach woke him, and he swam into the floating tangle of weeds and grass. The waterway wound and turned; here and there orchids could be seen on the tree trunks, and now and again a brilliant creeper had flung its purple flowers over a forest tree, but the general impression was one of gloom.

— Lake Januari. —

A mile or so further on we came out on to Lake Januari, which, according to Agassiz, contains more varieties of fish than all the rivers and lakes of Europe. On its banks are some settlements of Caboclos, the houses here being built above high-water mark, and some clearings for the cultivation of mandioca and sugarcane. The people were pleased to see us, and showed us the great iron pans used in preparing their farinha, the staple food of these parts, and their little enclosures of orange and coffee bushes. Roses were growing in pots and amaryllis was in flower near the houses, but the people evidently were very poor. Piles of turtle shells were lying about, all with

the mark where they had been hit with an arrow, and I was told that occasionally pacas, deer, and cutias were shot. Even here there was a vagueness as to the whereabouts of the water lilies, but a boy was found who said he knew the place well, as he had been there to gather the leaves to be made into medicine for consumption.

We got into a canoe and were soon gliding rapidly up a little outlet from the lake. The stream flowed very rapidly; numbers of birds rose quite close to us, as our progress was very silent among the half-submerged tree trunks.

— The Lily's Haunts. —

The stream widened; in front of us floated six or seven plants of the lily we had come to see. The great leaves lay on the water in groups, each one with its edges turned up, looking like circular trays. The color was a vivid green, shading through red to brown. Among them an object a foot long and five inches or so across, covered with spines like some immense horse-chestnut pod, caught the eye, and only after close inspection did one realise that it was a tightly rolled up leaf. The entire under-surface of the leaves and the whole length of the stalk were thickly covered with thorns, a very necessary protection against the many denizens of the river, who would like to make a meal of the succulent plant.

Water birds evidently walked on the floating leaves, as shown by the footmarks on some of them. The plants grew a few yards apart with clear water between them, and the effect one had expected from books, of the vast stretches of huge green leaves entirely covering the surface of the water, was absent. One group had two flowers open, their creamy rose petals, some 15 in. across, emitting a faint odour, and, while handsome enough, not perhaps quite as beautiful as one would be led to expect from the magnificent appearance of the leaves. We tried to obtain some roots to plant in a backwater near Manaos, but all our efforts proved futile. The stalks were terribly thorny, besides being slippery, so that a firm hold was well-nigh impossible, and on throwing down grappling irons the long juicy stems always snapped. At the period when the Amazon reached its lowest these plants would be obviously nearly uncovered, and the seed pods would be exposed all day to the fierce rays of the sun to ripen their seeds, but at that time the waterways, difficult enough to traverse now, would be impassable even for a canoe, as many fallen tree trunks and creepers would hinder the way.

Soils.

For raising seedlings and potting work generally there are three very important ingredients in the soil to be used. They are, writes an English gardening paper.

— Loam. —

This should be of a fibrous nature; it can always be obtained from a heap of fibrous turves. The turves should be cut about 3 inches thick and stacked in an open position with a sunny aspect. Before putting down any turves scatter some dry, unslaked lime on the ground; this will kill any insects lurking there. Place all the turves with their grass sides downwards and finish the stack by forming a pointed roof; then the rain will not enter and make the turf in a sodden condition. All turves should be cut from open ground, not near hedges, or old banks, nor from under trees.

— Leaf Soil. —

This is a very important ingredient, because its presence causes the formation of innumerable small fibrous roots of plants, and, in the case of seedlings, it is most essential and for many kinds of bulbs almost indispensable. Form several heaps in some out-of-the-way place where the material can be left undisturbed for some years. First there should be the heap of leaves well rotted, then the one of half-decayed leaves and, finally, the heap of new leaves, so that there will be different grades suitable for use mixed with fine loam, or with coarse mixtures for placing in the bottom of boxes and pots.

— Sand. —

Even road grit, if carefully washed and dried, will make a valuable ingredient for mixing with potting soil, as it will keep the whole mass porous; but coarse silver sand is the best, especially where cuttings, seedlings and fine-rooted specimens are concerned.

Vegetable Garden.

Notes for the Month.

The autumn rains should soon be with us, and every effort must be made to get the ground in the best order for their reception, so that none of the precious fluid shall be wasted.

At no season will the advantage of preparedness be more appreciated than at present, for the work of transplanting the main crop of the cabbage tribe can be rapidly proceeded with, and advantage taken of the first opportunity for general planting and seed sowing, while the soil is in the best possible condition, and the weather most favorable ; but which a few hours may change, thus entailing unnecessary labour and waste of time.

The appearance of the garden will now rapidly change, as the work of clearing the ground of summer crops, which have finished their period of usefulness, is proceeded with. Amateurs should note the importance of doing this as soon as possible, as they exhaust the soil unnecessarily if allowed to remain. Such old growth should be collected and burnt or stacked and left to rot down with the addition of a little gypsum.

Next the garden should be manured and deeply dug, leaving the surface rough to more effectually benefit by rain or artificial watering, and thus prepared it is ready to be raked down and used at the shortest notice. All vacant land also should be dug to reduce the weed trouble to a minimum and conserve the moisture for future use.

The seed beds, too, need careful attention in thinning, weeding, and watering, thus promoting the strong stocky plants so essential for future success, and any seedlings already planted will well repay frequent watering.

Gather all seed required and remember that in gardening careful selection of the offspring of the best and strongest is as important and yields as good result as in any other.

The present abundance of most of the summer crops, such as cucumber, tomato, trombone, pumpkin, piemelon, etc., should be taken advantage of and careful storing, canning, or preserving practised.

Herbs are always useful, and more attention should be paid to this branch of gardening. Parsley, basil, sage, caraway, thyme, marjoram are easily cultivated, and seed should be sown or plants divided.

— Calendar. —

Readers must consider their conditions and decide whether favorable to early or late sowings, but all the plants enumerated will thrive and grow abundantly with the cooler weather and natural moisture we may now expect.

Artichoke (Globe).—Seeds of the globe artichoke may be sown in light sandy soil, grown on and planted out in the spring. They will not, however, be fit to cut from till the second season.

Asparagus beds should be looked to. All ripened stems will need cutting down close to the surface, and the beds will be benefited by copious supplies of liquid manure. Seed may be sown now or stored till spring.

Beans.—They need rich ground and stable manure and super should be freely applied.

Beet.—Sow in drills 2ft. apart.

Borecole, broccoli, Brussels Sprouts, Cauliflower, Cabbage.—Well grown seedlings should be planted out and kept well watered. They are all gross feeders, and therefore require a large amount of nourishment, which may be applied hot and strong. Distance between plants will vary, according to size of variety ; 18in. is sufficient for small, up to 3ft. for large.

Carrot.—Carrot seed will not perish during dry weather, so may be sown and left to germinate when rain comes, or it may be hastened by being kept moist. Rows 15ins. apart for small and medium, and 2ft. for large will be found best.

Celery.—Apply liquid manure and earth up as required.

Corn, Salad.—May be sown now and treated as lettuce.

Cress. — Sow largely where water is abundant.

Culinary Herbs.—Sow all that are desired.

Endive.—Seed should be sown in drills 1ft. apart.

Jerusalem Artichokes. — The tubers keep best in the ground.

Kohl Rabi.—A delicious vegetable. Treat same as turnip.

Leek.—Sow and plant out in renches when ready, giving plenty r liquid manure.

Lettuce.—Full sowings may be nade. It is still best to do so in rills where thev are to remain.

Mustard may be sown largely.

Onion.—Sow for early spring; ise in drills 15ft. apart. The round should be worked to a fine ilth and wood ashes freely mixed vith the manure which is applied.

Care should be taken to get the ed level, and it must be kept free rom weeds.

Parsley.—Sow freely. As an dging it is effective, but harbors lugs.

Parsnip.—Sow in drills 18 ins. part on well-prepared, deeply-dug eds.

Peas.—Sow for succession early arieties, and prepare ground for nain sowing, 3ft. to 5ft., accord-ng to size, is a fair distance be-ween the rows.

Radish.—Sow largely of all orts, broadcast or in drills; thin arly and use when young. They equire a good deal of water.

Rhubarb. — Cut off flowering tems and prepare ground for new eds.

Savoy.—Treat as cabbage.

Seakale.—Encourage growth and prepare ground for new beds. Keep clean and well watered.

Shallots.—Plant out in rich soil.

Spinach.—May be sown largely; a rich soil is necessary, so manure liberally with nitrogenous manures prior to sowing, which should be done in shallow drills 12 or 18 in. apart. Keep the ground well watered and grow quickly.

Where cabbages or cauliflowers

Turnip.—Sow a dull crop of for winter use; hoe well and apply a sprinkling of bonedust while the plants are in the rough leaf.

are attacked by the green caterpillars (Plutella cruciferarum) treatment should be applied at once, or the plants will be ruined. Tar water is recommended as a cheap and effective remedy. Boil water, rain water for preference, or add a little soda. The while it is boiling add tar, a few drops at a time, keeping it stirred. It will dissolve slowly, and the water will not take up much. This can be applied with a water can, but better with a spray pump.

Old asparagus beds, if not already cleaned of last year's growths, should be cut free of them as soon as the plants turn brown. They should be cut down to the surface of the ground. The ground should then be lightly forked, and a good dressing of stable manure, ashes, poultry droppings, superphosphates, or other fertiliser should be spread over, and a moderate quantity of common salt sown over the surface and forked in. Young beds of asparagus may be planted, but there is plenty of time for this. However, it is a good plan to get the ground ready.

When inserting the roots of onion plants care should be taken to place them straight down into the hole, and the soil must be pressed firmly against them, but the base of the stem should not be buried, as the onion forms and swells better when only half covered with soil. Ordinary wood ashes are useful in forming onion beds, having both mechanical and manurial effects.

Onions should be planted out after working the soil up finely. These succeed best in free, open soil. If the plants are grown pretty large in the seedbeds it will be advisable to cut the roots off cleanly to about a couple of inches long, and to cut the tops

back to a certain extent. This practice does not seem to have any very injurious effects, and facilitates the operation of dibbering in the plants. The young onions are set about 6 or 8 in. apart in ordinary soils, but wider apart in rich ones. The rows need only be a foot apart.

In wet spots, where the soil becomes somewhat stagnated, peas and beans will not thrive during the cold months. Early sown peas will require staking and the soil loosening frequently between the rows. The soil should be kept stirred as often as practicable between growing crops.

Where danger from frost is rare potatoes may be planted, using small sets about the size of a hen's egg. Uncut tubers are generally considered best, and seed potatoes should be procured from a different locality each year, if possible. These like good rich loose soils, and are benefited by potash manures, perhaps in small gardens most readily supplied by wood ashes. The sets are usually planted 4 to 6 in. deep, and, of course, should have "started" to sprout before planting is done.

Garlic, tree onions, and shallots may be planted now.

If slugs are troublesome, go out every evening and dust with dry

air-slaked lime. A few specks settling on a slug will kill it. I find this a good plan, although it is apt to make the bed look untidy. Pestend is also an excellent remedy. Baits dipped in a solution of arsenate of lead are even less work.

How to Keep Vegetables.

The manner in which produce purchased from the market is kept by the retailer until it is sold often makes all the difference as to whether the particular purchase pays or not. Many retailers bunch parsley and put it into water. This is a mistake. It should be spread out upon clean paper in the cellar of the vegetable store, and be very lightly sprinkled with water, then sheets of paper laid over. These sheets may be occasionally sprinkled with water. So treated, it will be found to keep much better than if put into water, where it soon gets slimy and rotten.

Chicory, instead of being left in the market box or basket, should be stood up in pans, with about ⅛in. of water at the base. So treated, it will improve in texture, instead of getting outsidey and brown, as we too often see it. Endive should be treated in the same way, and it will continue to blanch and improve in quality, and may be so kept for a long time. Both endive and chicory should be kept in total darkness. Most of the complaint of the public as to the bitterness of endive and chicory is a result of exposure to daylight while in the shopkeepers' hands. Mustard and cress should have damp paper put over it, and should not be wetted, or it will soon decay.—"The Market Gardener."

Sweet Potatoes.

This plant, which belongs to the Convolvulaceœ, does best in warm climates, where it replaces the Irish potato. It does best where the land is moist, or where frequent rain is recorded during the period of growth. Wet weather at the time of ripening induces a second growth, and is injurious to the raising of a profitable crop.

Although the plant is perennial it is treated as an annual. As it flowers rarely, and the seeds give rise to a variety of types, slips, or sets about four inches long growing on roots placed in hot-beds are used when sufficiently developed, and one single sweet potato will produce quite a number of these slips.

Compared with Irish potatoes as a foodstuff, sweet potatoes show about one and a half times as much nutritive matter; they contain about 10 per cent. less water, the same proportion of mineral constituents, a little less protein, more fat, and about 10 per cent. more carbohydrates as starch and sugar.

One or two bushels of small potatoes will produce enough slips to plant an acre. A second and sometimes a third growth of slips will show after the first one is ready to pull. If green vines are available cuttings may be used instead of slips grown on the tubers. When slips are pulled they should be dipped at the base in liquid mud made of clay and cow manure.

The varieties are numerous; they are either syrupy; mealy, or intermediate. The flesh is yellow or white; the leaves deeply indented, shouldered or round; the skin is white, yellowish, light-red or purple.

The soil most suitable as regards its texture for the growth of this root is a sandy loam which remains friable and does not bake. It does well also in limestone clay, but there the crop is harder to dig.

A four-ton crop removes in the roots alone 30 lbs. of nitrogen, 13 lbs. of phosphoric acid, 64 lbs. of potash. The vines, which weigh more than half the weight of the crop are richer in nitrogen. It is thus seen that heavy fertilising is required to ensure a large crop; humus is very desirable, and can be provided by growing the sweet potatoes after a leguminous crop or a green crop fed off on the ground. A wide interval in the rotation is desirable to guard against pests and diseases. If the soil is not wet at the time of planting, some water should be poured over the slip so as to settle the soil around it; in that case some dry earth is raked over to check evaporation. Shallow cultivation is necessary after planting to break the crust and root out the weeds.

The crop is ready to dig when the roots are mature, which can be ascertained by cutting a few roots. If, on drying, the wound heals over with a whitish starchy appearance, the roots are ripe; if they turn blackish in color, they are not. Digging may be done in the field by means of a ridge plough, after the vines have been cut. Any unsound and bruised root will decay, and should not be stored. After the roots have sweated a little they can be packed in ventilated cases for marketing.—"Bulletin of the Departure of Agriculture, W.A.

Beans for Winter Use.

It frequently happens that the amateur gardener, who grows vegetables for home consumption only, finds that during the height of the season, his runners and French beans are produced in much greater abundance than is required for the family needs. It cannot be too well known, therefore, that a supply of this useful vegetable can be easily preserved for use during the winter months.

The bean should be gathered in dry weather (great heat is liable to cause them to mildew), and placed in a china or earthenware vessel, arranged in layers, with a thick sprinkling of salt between each layer. The vessel containing them should be kept in a cool and airy situation.

In a few days times the beans will be found to have shrunk considerably, and the salt to have melted into brine. More beans and salt can be added from time to time, until the vessel is quite full. Should the weather be very hot and damp, the beans should be inspected every day or so, and the top layer pressed under the brine, otherwise those that are not quite submerged may show signs of mildew. If this is the case, the affected beans should be at once removed, and more salt scattered over the top. When once the cooler weather sets in they will need no further attention but will keep good indefinitely in any place free from frost.

When required for use they should be litfed from the brine and washed in cold water. The strings can then be removed, and the beans cut up in the usual manner, and they should be allowed to lie for an hour or two in water before being cooked in order to remove any trace of saltiness. A pinch of soda in the water in which they are boiled will greatly improve the colour.

Vegetable Pests.

So many specimens of insect and other pests of various kinds which attack vegetables are being forwarded for identification that it has been deemed advisable to compile a few notes on some of the more common of these pests.

— Thrips. —

more readily treated.

The following remedies have proved successful :—

Benzole emulsion.—This is a patent preparation, and can be purchased at any of the leading seed shops in Adelaide. One tin full (1lb.), when diluted, makes five gallons of spray. The smell of the benzole remains on the plants for several days.

As a deterrent, spraying with coal tar water or a weak kerosene emulsion is recommended. A good hosing with cold water is also beneficial. The formula for coal tar water is as follows :—Boil one pound of coal tar in two gallons of water, and while hot add from 50 to 60 gallons of waeer.

— Cut Worms. —

Caterpillars belonging to the genera Agrotis, Heliothis, Plusia, are the chief members of this group. They are most destructive, and attack tomatoes, capsicums, beans, onions, cabbage, lettuce, etc. The caterpillars hide amongst the debris and soil during the day time, and at night come up to feed. Many gardeners cannot understand how it is that a whole plant laden with tomatoes can be destroyed in one evening, when they can see no trace of any insects. If the ground around the plants be turned up the grubs, usually curled up, will be discovered about an inch under the soil. The moths hide in the daytime under grass wood, stones, bags, etc., and when darkness is setting in they fly about from plant to plant, depositing their eggs as they go.

The arsenate of lead spray has proved one of the best remedies yet discovered for these pests; but cabbage, lettuce, and other such vegetables should be washed before using. Poisoned baits are also used with success, the formula being as follows :—Bran, arsenic, and sugar mash: The best proporeion to use is a part (by weight) of arsenic, 1 of sugar, and 6 of bran to which is added a sufficient quantity of water to make a wet mash. This preparation is usually made in wash tubs or half barrels. One of these is filled about three-fourths full of dry bran, and to this is added about 5 lbs. of arsenic, which is thoroughly stirred through the bran with a spade or shovel; 5 lbs. of sugar is next thrown into a pail, which is then filled with water, and the sugar is stirred until it dissolves. When the sugar water is added to the bran and arsenic, and the three well stirred, more water is added, and the stirring continued until every portion of the mash becomes thoroughly saturated. About a teaspoonful of this mixture is placed at the foot of each plant or shrub infested, dropping it in the shade when this can be done. Care must be taken that this bait is placed beyond the reach of children and domestic animals.

— Pumpkin Beetle. —

A very common mistake is made by confusing this pest with the beneficial Ladybird. The most distinctive feature about the pumpkin bettle is that it is an elongated bettle, while the laybird is almost round in shape. The following are preventives, cold tar water, Paris green, kerosene emulsion, and arsenate of lead. Inspector E. Wallis, of Wangaratta, states that the crude oil of tar remedy has been tried with good results, the following being the formula :—Crude oil, ½ pint; soft soap, ½ lb.; caustic soda, 1 oz.; water, 5 gallons. Boil one pint of water, and in it dissolve the soap and soda; add oil of tar, agitate well, and add remainder of water; cool and use.

— Cabbage Moth. —

The larvae of these moths are now making their appearance on the cabbage, cauliflower, turnip, and radish plants. In my opinion the best remedy to adopt is spraying with arsenate of lead. Coal tar is also a good mixture to use against this pest, the proportion being the same as for thrips.

— Cabbage Aphis. —

For this pest spray with nicotine as follows :—Steep 1 lb. tobacco in 1 gallon of hot water, and allow it to soak for 24 hours. Boil 1 lb. soap in 1 gallon of water until the soap is dissolved. Strain the tobacco water into the soap water. Stir well, and make up to 5 or 6 gallons. Use waste stems of the tobacco.

— Metallic Tomato Fly. —

This handsome fly, which is of a metallic colour, caused some damage to ripe tomatoes during last season. But my experience of this insect is that it only attacks over-ripe or damaged tomatoes, thereby hastening decay; a sound tomato is rarely attacked. When once the maggots are in the tomatoes it is an impossibility to reach them, and such tomatoes should be picked and burnt or placed in boiling water. Deterrents such as recommended for thrips are also beneficial. From—Insect Pests By C. French jun., Victorian Journal of Agriculture.

The growing demand for fruit of first quality, and the fact that as years pass consumers will become even more insistant in their desire for quality, will naturally lead the intending orchardist or one who may be contemplating renewals and addisions to his orchards, to be particularly careful as to the varieties selected, and the source whence the trees are to be procured. The growing of nursery stock is an occupation which requires considerable knowledge and supervision. Mr. Pike is one who spares neithes time nor thinking power in the production of the healthy well-grown and rooted stock which he has for disposal. The autumn planting of all the citrus tribe, in which, as readers are aware, Mr. Pike specialises, is becoming increasingly practiced. There are some districts, of course, in which to do so would be a serious handicap to trees so treated; but, speaking generally, for most parts of South Australia. Autumn planting is safe, and has much to recommend it. During a recent visit to the Clairville Nurseries we found everything in the excellent condition which betokens painstaking and thorough attention to all details, and we can confidently recommend any reader who may be establishing a garden to either see or write to the Clairville Nurseries.

Wife: Well, there you are, George! And did you have a good time? Was the hotel you stopped at homelike? (dryly): Very, darling. There wasn't a thing in it fit to eat.

Fruit Garden

When is the Fruit Dry.

In drying apples there is no step in the entire process that requires better-trained judgment than the matter of determining when the fruit is sufficiently dried to meet the requirements. Like several other steps in the process it is largely a matter of experience, though there are certain general features which are capable of being reduced to words.

The fruit should be so dry that when a handful of slices is pressed together firmly into a ball the slices will be "springy" enough to separate as once upon being released from the hand. In this condition there will be no fruit, or only an occasional piece, that has any visible moisture on the surface. In a slice of average dryness, it should not be possible to press any free juice into view in a freshly made cross section of it. The general "feel" of the fruit, as it is handled, should be a soft, velvety, leathery texture.

The foregoing should represent as nearly as possible the average condition, but it can not be expected to be absolutely uniform throughout. Some slices they should constitute only a very small percentage—will still plainly possess some of the juice of the apple; others—likewise, properly only a small proportion—will be entirely too dry, possibly dry enough to be brittle.

A Note on Figs.

When men began to plant wild fig trees in their gardens, they would, of course, propagate them by cuttings. Now cuttings of the wild fig tree are found to reproduce the characters of the branches from which they were taken.. By taking cuttings from branches destined to bear spring inflorescences, trees have been produced in which only the spring inflorescences regularly attain complete maturity: these trees are Caprifigs (goat figs), which are practically male. In the same way, by using as the parent stock branches which bear summer inflorescences, trees have been produced which are entirely female. Of these two the caprifig alone is capable of harbouring the insect guest during its harbouring the insect guest during growth period.

Two fig trees, very different in appearance and function, have thus been developed by the action of men out of the single primitive stock: they are often called varieties, but Tschirch and Ravasini show that they are really artificially produced sexual forms of one and the same natural species, viz., of the wild fig tree. One proof is that seeds of the cultivated fig tree produce either caprifigs or inferior fruiting figs. A further proof is yielded by the fact that the female Blastophaga, when laden with eggs, can only fly a very short distance. Hence we infer that she is adapted to a monoecious fig tree, in which all the forms of inflorescence are to be found on one tree. The cultivated fig tree is practically dioecious, and without artificial pollination ripens no seed. Only one monoecious tree is known, which can be regarded as a possible common ancestor of the two infertile forms, caprifigs and fruiting cultivated fig; this common ancestor is the wild fig tree.

Fig cultivators must have become early acquainted with the Blastophaga and the effects of its visit, for the female flowers of the fig remain unfertilized if no Blastophaga enters them, and unfertilized female inflorescences (in unimproved fig trees) fall off prematurely. To prevent such failures, the expedient was successfully tried (ages ago) of fastening to the female trees ripe staminate inflorescences of the wild fig trees. Blastophagas and pollen were thus supplied together, and the female inflorescences duly ripened. In course of time the inflorescences of the wild fig tree were replaced by those of the

caprifig, which answer the same purpose, and are easily raised on the spot. Thus arose the practice of caprification which is essential to the production of the best keeping or drying figs.—Nature.

Pollination of Apples.

It being accepted that many varieties of apples require pollen from flowers of another variety in order to produce fruit, it becomes of importance to know the time of flowering of different varieties, since the chances of successful pollination will be greater if varieties flowering at the same time are intermixed.

An article in the Journal of the Royal Horticultural Society gives the results of observations taken at the Royal Horticultural Society's Garden at Wisley (England) as to the average order of flowering of varieties of apples in the four years 1908-10. The earliest date of full bloom of the earliest variety (Red Astrachan) at Wisley was April 21st., and the latest date of full bloom of the latest variety (Royal Jubilee) was May 23rd, and the period of full bloom varied from 18 to 35 days. The dates of flowering of a few of the varieties may be given for purposes of comparison. The number of days that elapsed between the flowering of Red Astrachan (the earliest) and Early Peach was 4$\frac{5}{8}$ days; Duchess of Oldenburgh, 5$\frac{5}{8}$ days; Keswick Codlin, 5$\frac{3}{4}$ days; Stirling Castle, 6$\frac{1}{4}$ days; Early Rivers, 7$\frac{1}{4}$ days; Lord Suffield and Ribston Pippin, 8 days; Cox's Orange Pippin and Lord Grosvenor, 10$\frac{5}{8}$ days; Duke of Devonshire, Early Victoria, and Beauty of Bath, 10$\frac{3}{4}$ days; Worcester Pearmain and Lord Derby, 11$\frac{3}{4}$ days; Ecklinville Seedling, 11$\frac{7}{8}$ days; Lane's Prince Albert, 13$\frac{1}{3}$ days; Pott's Seedling, 14$\frac{1}{2}$ days; Bramley's Seedling, 14$\frac{3}{8}$ days; Cox's Pomona, 14$\frac{3}{4}$ days; Mr. Gladstone, 15 days; Thomas Rivers, 15$\frac{1}{2}$ days; Surprise, 16$\frac{3}{5}$ days; Sandringham, 17$\frac{3}{4}$ days; and Royal Jubilee, 18$\frac{7}{8}$ days.

The result at Wisley are compared with results obtained at Sawbridgeworth, Woburn, Wye, Herefordshire, at stations in the United States, and at Burnley (Vic.) and it is evident that apples retain their characteristic earlier or later flowering propensities regardless of differences of locality.

Eradication of the Blackberry.

(Continued from February.)

I finished rather abruptly in my article in the February number. I tried to explain the method of shovelling off the blackberries, but I quite forgot and omitted to speak about patches where there are any loose stones, etc. These patches are difficult to deal with, and salt is sometimes used, but I think it depends a lot on the position, as well as the time of year salt is applied, and the best way if salt is to be used is to experiment with it at different times and use it in different ways; careful notes should be made, and then one will know the most effective way and time to use salt. I tried this on a small patch that were growing on a small patch of stones. I had an old packet of sheep-dip lying about, and I mixed about 2 pounds of the powder in a kerosine bucket of water and applied it with a small spray pump This was very effective, and whether I mixed it too strong or not I don't know, but it killed the patch out all right. I applied the solution to them just in their growing state (not cutting them off before) in December and there is no sign of them shooting yet. Perhaps it would not act so well if applied now, but I think it is worth trying. I just sprayed the solution on as you would on to an apple tree, taking care to give the lower parts a good drenching. The particular kind of spray pump was the "Success," but there are several other makes, equally as light, and would serve the purpose as well. The sheep-dip was Quibell's.

ANTI-BLACKBERRY.

"Top" Brand Supers.

We have received from the Adelaide Chemical & Fertilizer Co., Ltd., a copy of a well arranged booklet issued by them, in which the theory and practice of manuring is discussed, with more particular reference to the numerous general and special manures which carry the well known "Top" brand.

It is conceeded throughout the farming community of the Commonwealth that South Australia leads the way in profitable farm practice. This enviable position is very largely, if not wholly, due to the early recognition of the vital importance of making good the general deficiency of our soils in phosphoric acid, and to the commendable energy and enterprise with which merchants and manufacturers have, during the last few years, responded to the demand for an ever-increasing supply of artificial fertilizers, in which form alone is manuring at all practicable over wide areas of the State.

It is satisfactory to know that in the keen competition for this important section of rural trade, the Adelaide Chemical & Fertilizer Co., Ltd., which is entirely a South Australian concern, at an early stage took and have since maintained a position which is effectively indicated by their well-known trade mark. It is interesting and instructive in this connection, and as an illustration of the South Australian farmers' appreciation of the importance of the subject, to remember, that of the 2,700,000 acres, which is the estimated area under crop in South Australia, 2,200,000 acres, approximately 80 per cent., receive more or less adequate dressings of manure of some sort. Of the immense quantity thus employed, over 80,000 tons is in the form of one or other of the various artificial fertilizers. Eighty per cent. of manured land is without doubt a satisfactory proportion, but aside from this fact experts on the subject agree that heavier dressings than commonly applied could be profitably employed. There still remains over half a million acres under crop; the owners or occupiers of which are neglecting what in many cases would undoubtedly prove to be a most important item in profitably working their holdings.

It is to such owners or occupiers that the booklet we have just been reading (a copy of which will be sent on request) is, we believe, principally addressed; and certainly it is they who may be most largely benefited by the lessons it teachers. To us there appears to be only two excuses for the man who fails to do justice to himself, and his land and indirectly to his country. These are either lack of funds or lack of brains. To the former we need only say that the Adelaide Chemical & Fertilizer Co., Ltd., offer liberal terms, and to the latter that those of others are at his disposal in the pamphlet now before us.

"Why have you cut that lady who has just passed? Yesterday you were most cord al towards her." "That is my dressmaker, and I paid her bill this morning.

How to Plant Citrus Trees.

Citrus trees must not be planted too deeply, but do not go to the other extreme. Dig the hole not less than three feet across and as much more as you like, also as deep as you like, up to three feet. Fill in the bottom with material from the garden rubish heap, which has well rotted, and road sweepings. Do not use the latter if there is any tar present. This, with the soil taken out, will make a mound, and on this mound the tree is planted so that when the soil has thoroughly settled, the big roots, where they spring from, the stems will be just above the general surface of the ground.

It is usual for the trees to be taken up with a ball of earth and be bound up in a piece of bagging, with or without some green stuff or straw. It is also usual for the planter to set the tree just as it comes to him, taking pains not to disturb the ball of earth. Now, if the ball of earth is a natural one and has not been compacted into a clod, this is all right; but quite frequently the man, in taking up the tree, is unable to take it with a natural ball of earth. The soil, if in a free condition, falls away, then he lifts it as well as he can while working hard, puts it on the piece of bagging with a shovel full of soil, and soon has it in a ball, which will cake like a brick. Even if it be a natural ball, the wrapping up and handling will consolidate the soil. Then it is quite likely fine roots have been preserved by the careful nurserymen and bedded in the soil in a wrong position in the belief that the planter will put them right.

For all these reasons I believe the better plan is to have the place where the tree is to be planted well prepared with plenty of fine moist crumbly soil ready, and then to break up the ball of earth and set the tree as you would repot a plant, watering it in to settle the soil nicely against the small rootlets.

—Should Citrus Trees be cut Back?—

This is a question about which there is considerable difference of opinion. Much depends on circumstances, such as—

1. Time when the tree is moved.

2. Nature of the soil.

3. Conditions under which the tree is planted.

4. Length of time it is out of the ground.

5. Quantity of root left on the tree, and so on.

I have at different times obtained the opinions of many experienced men, and I have conducted experiments in order to test the relative growths of trees not touched and those cut back in various ways. The result of my enquiries and experiments is to advise moderate trimming or pruning of the tops of trees at the time of removal.

Should the trees have to be taken a long distance I would cut hard back. Should the roots be greatly reduced I would reduce the tops in rather greater proportion; in fact, it may be taken as a guiding rule that the branches of a transplanted tree should be cut back to correspond with the mutilation of the root system, because there is always an exact relation between the two.

— To Move an Old Tsee. —

Prepare the place for the tree first by making a hole 6ft. across, or by double-digging that area.

Next prune the tree, covering all wounds with grafting wax or paint. Then remove the top soil from the area formerly covered by the branches of the tree. Do this with a fork and avoid 'damaging the fine roots. Put the fine roots aside and dig a trench round the tree, cutting the larger roots. Water the roots to keep them moist and carry to the new place, planting as described for a young tree and pressing and watering the soil round the roots as they are put in place.

— Some Advice. —

1. Do not plant citrus trees for profit unless you are fairly sure that the conditions are favorable. Experimental work may be desirable.

2. If the prevailing winds are such as to render growth of the trees difficult, don't plant for profit.

3. If the soil and climate are not proved to be thoroughly favorable, don't plant for profit. Experimental planting may be desirable.

4. If you cannot water the trees cheaply and you have not proved absolutely that they will thrive without water, don't plant for profit. Experimental work may again be desirable.

5. If you are determined to grow citrus trees, select soil, situation, and conditions which have been proved to be suitable, or the chances are you will never grow them at a profit.

6. Over a wide area of Australia citrus trees will grow sufficiently well with care, water, and shelter to encourage the amateur planting a home garden to include one or more oranges and lemons. Although they may need special preparation of the soil, special situations, and artificial shelter from hot or cold winds or frost, they may give great pleasure in growing, are beautiful trees, and may produce satisfactory crops of fruit.

7 and lastly. If you want to grow citrus trees for fun it does not matter whether you have only flower pots, old barrels, or a housetop, you may obtain some fruit and some amusement.

Readers! Can you write u something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

Contact Insecticides.

In spraying the term "contact insectide" is used as referring to those substances which kill through coming in contact with the outer surface of the insect body in contradistinction to those which must be eaten to be effective. Little work has been done to determine exactly how such substances kill, but the belief commonly held is that they act by plugging up the breathing pores, thus causing death by suffocation. This was the first point tested in the experiments reported on in a "Bulletin" published by the Michigan Agricultural College. In discussing it the authors report that it was found extremely difficult to kill many insects in a reasonable time merely by depriving them of air, and it is concluded that the certain and fairly rapid death caused by such materials as kerosene and gasolene cannot be due to the stoppage of the tracheae alone. It was also found that air saturated with the vapour of various insecticides was nearly as effective as the liquids themselves. Further tests showed that in the use of many insecticides, such as kerosene, gasolene, creolin and pyrethrum, vapour penetrated the tissues and caused death long before the liquid or powder itself had time to penetrate the chitin, or to cause suffocation by the plugging of the tracheae. The evidence gathered seemed to show that the vapours after absorption in the insect body become mainly effective through some tendency their presence exerts to prevent absorption of oxygen by the tissues.

In the same bulletin the authors in referring to lime-sulphur wash, report that its action was found to be peculiar. Unlike the other contact insecticides reported on, no proof could be obtained that lime-sulphur wash had penetrated into the tissues of insects. It appeared to have very little effect on large insects having heavy chitinous coverings. Various theories were tested, but it was finally concluded that its action on scale insects was due partly to the fact that it takes up oxygen in comparatively large quantities, thus indirectly suffocating the insect which it covers, and partly to its effect on the wax at the margin of the scale. It was found that this was affected by the wash, with the result that the insects were absolutely sealed in under the scale covering.

Cultivation and Manuring of Orchards.

By J. C. Brunnich.

(Continued from page 452).

Drainage.—It is of the greatest importance that the soil of an orchard possesses perfect drainage; and, for this reason, soils with a heavy clayey subsoil are rarely suitable for fruit culture. Loose well-drained soils absorb and retain moisture much better than undrained soils. Drained soils are always warmer, are easier to cultivate, and allow an early cultivation even after heavy rains. Badly drained soils are generally sour, cold, and badly aerated. The aeration or the entering of air into a soil is of greatest importance, as it promotes bacterial activity, and liberation of plant foods. Drainage induces the development of a good root system, the roots are sent deeper into the ground, and trees are, therefore, better enabled to stand droughty conditions.

Tillage.—The objects of tillage, which may be subdivided into ploughing and cultivating, are pretty well the same as those of drainage, and are briefly the following:—

The soil is loosened, the roots are allowed therefore to develop readily in all directions, plant foods are liberated and made available; rain is readily absorbed, evaporation checked, moisture therefore conserved for future use and maintained near the roots; admits air into the soil, which is beneficial to the roots, and more particularly to the bacterial flora of the soil; promotes nitrification, an important process, due to activity of bacteria, by which nitrogenous organic matters are changed, first into ammonia compounds, and, finally, into nitrates, and are thus made available to the plant roots; breaks up any hard-pan, an impervious layer frequently formed between soil and subsoil, and thus allowing roots to go down to subsoil for plant foods and moisture.

Ploughing must be done thoroughly; do not be afraid to cut a few roots, as these surface roots cut are of little use during dry weather.

Plough in the late autumn and winter to a depth of 4 to 6 inches, keeping to the greater depth outside the spread of the branches.

Cultivating carried out during spring and summer, must be done in a thorough manner, and more particularly, weeding and cultivating should not be attempted in one operation.

Thorough cultivation keeps the top soil in a state of fine mulch, which greatly prevents evaporation by breaking the continuity of the capillaries which bring up the moisture from below.

The old-fashioned idea which exists in some localities of allowing grass to grow under the trees, or keeping the orchard under sod, cannot be recommended, more particularly, as most of our orchards are grown on rather poor classes of soil. Should it be desired to grow cover crops, suitable green manure crops should be selected, which will require only a short time for their growth, are then ploughed under, or used as a mulch around the trees.

Green manuring, greatly improves the texture of the soil, and increases the amounts of available plant foods, and should be particularly practised from the very start of an orchard. As a rule leguminous crops are to be chosen, and ploughed under as soon as they come into seed. There can be do doubt that although the green crop shades the ground, and keeps it cool and moist, a large amount of moisture is required for the growth of the crop and a lot is lost by transpiration through the leaves. In dry seasons, therefore, the green manure crop may rob the trees of some of the necessary moisture.

Mulching keeps trees healthy and vigorous, by shading the soil, and

keeping roots cool, retaining moisture, keeping down the weeds, and increasing the amount of organic matter (humus) in the soil. On light-coloured sandy soils mulching prevents the scalding of trunk and lower branches by the reflected heat of the sun. Heavy soils are made much looser and easier to work by mulching.

Suitable materials are bush rakings, compost of all kind, stable manure, rotten straw, cornstalks, weeds, and green manure crops.

The only drawback of mulching is the possibility that it may harbour some of the many insect pests.

Manuring. In my article on "Complete Fertilisers for Farm and Orchard" which appeared in the Agricultural Journal, I gave mixtures of artificial fertilisers necessary for each variety of fruit trees under normal conditions. I have now to go a step further and consider some of the abnormal conditions and find fertilisers for such. Before doing so we must recapitulate briefly the functions of the various important plant foods.

Nitrogen more particularly promotes and stimulates plant growth

Phosphoric acid promotes fructification and hastens maturity.

Potash promotes a vigorous growth of tissue, strong and healthy wood, aids in the production of starch and sugar necessary for fructification, and gives the trees more resistance against frost and disease.

Lime helps potash in the formation of wood, and production of sugars, and is more particularly required for the formation of the stones and kernels. Much larger amounts of lime than of all the other plant foods are required, and especially cherry trees require very large quantities.

When manuring an orchard we have to keep the following three principal cases in view:—

1. The fruit trees are in normal condition with regard to growth and formation of fruit, and manure is to be applied to maintain this condition.

2. The trees are not prospering with regard to growth and production of fruit, and manures are required to produce a normal condition by increased growth.

3. The trees are making an exceptional vigorous growth but produce little or no fruit, and manures are to be applied to aid in fructification.

The smallest amounts of artificial fertiliser required for apple, pear, and peach trees, for trees of various size (small to medium) would be for—

1st case: ¾ lb. to 2 lb. superphosphate.
⅛ lb. to ½ lb. nitrolim or sulpate of ammonia;
¼ to ¾ lb. of sulphate of potash.

2nd case: ½ lb. to 1½ lb. superphosphate,
½ lb to 1 lb. nitrolim or sulphate of ammonia
⅛ lb. to ½ lb. sulphate of potash.

3rd case: ¾ lb. to 2 lb. superphosphate,
No nitrogen,
½ lb. to 1 lb. sulphate of potash.

It is generally better to use instead of superphosphate by itself a mixture of superphosphate and bonemeal, at the same time increasing the amount. None of the above quantities quite come up to the formula given in the above mentioned pamphlet as a complete fertiliser for apples, but, as already stated, the quantities given are minimum amounts, and can profitably be increased. They are given to illustrate how to modify the application of artificial fertilisers to meet the requirement of different cases, and all other manuring formulae can be changed in proportion, bearing in mind that for the 2nd case the amount of nitrogen is increased to promote activity of growth, whereas in the 3rd case the nitrogenous manure is left out to check the growth.

Of natural fertilisers well-rotted stable manure and compost are of particular value to fruit trees, as they not only supply the necessary plant foods in proper proportion, but also improve the physical condition of the soil and greatly aid the bacterial activity. To old orchards apply after the winter ploughing from 10 to 15 loads of farmyard manure, and in early spring the dressing of artificial fertilisers, for instance a mixture of 1½ cwt. bonemeal, 1½ cwt. superphosphate, 1½ cwt. sulphate of potash, and 1½ cwt. of nitrolim or sulphate of ammonia per acre.

Lime is, as already stated, an indispensable plant food of fruit trees, and unfortunately, many of our fruit soils are very deficient in lime. The lime may be applied either in form of quick or air-slaked lime or in form of carbonate of lime, limestone screenings, shell sand; the former is to be used in quantities from 10 cwt. to 1 ton per acre for heavy clayey soils, and the latter in quantities from 1 to 2 tons per acre for light soils. Every third year half of the above amounts should be again applied.

How to Destroy Sparrows.

From Bulletin 383 U.S.A. Department of Agriculture.

— Introduction. —

In its economic relations the English sparrow among birds is comparable to the rat among mannals. It is cunning, destructive, and filthy. Its natural diet consists of seeds, but it eats a great variety of other foods. While much of its annual fare consists of waste material from the streets, in autumn and winter it consumes quantities of weed 'seed, and in summer numerous insects. The destruction of weed seed is undeniably in the sparrow's favor. Its record as to insects is not so clear. There is substantial evidence that it eats certain harmful insects quite freely when these are abundant, but that it habitually seeks insects, or that it prefers them to seeds or other vegetable food, is not borne out by the evidence. Out of 522 English spatrow stomachs examined by the Biological Survey, 47 contained noxious insects, 50 contained beneficial insects, and 31 continued insects of little or no economic importance. This report shows conclusively that, aside from the destruction of weed seed, there is very little to be said in the sparrow's favor.

On the other hand, much can be said against the bird. It destroys small fruits, as cherries, grapes, pears, and peaches. It also destroys buds and flowers of cultivated trees, shrubs, and vines. In the garden it eats seeds as they ripen, and nips off tender young vegetables as they appear above the ground, peas and lettuce being especially subject to attack. It damages wheat and other grains when newly sowed, ripening, and in shocks. It reduces the numbers of some of our most useful native species such as bluebirds, house wrens, purple martins, tree swallows, cliff swallows, and barn swallows, by destroying the eggs and young and by usurping the nesting places. It attacks other familiar native native birds, as the robin, wren, red-eyed vireo, catbird, and mocking bird, causing them to desert parks and shady streets of towns. Unlike our native birds whose places it usurps, it has no song, but is noisy and vituperative. It defiles buildings and ornamental trees, shrubs, and vines with its excrement and with its bulky nests.

The evidence against the English sparrow is overwhelming, and the present unfriendly attitude of the public toward it is reflected in our State laws. Nowhere is it included among the birds that are protected. In response to frequent inquiries for means of abating the sparrow nuisance received by the Biological Survey, a few approved methods applicable to different conditions are here described.

Sparrows frequently give annoyance by roosting in ornamental vines and in crevices about buildings. If driven out late at night, several nights in succession, they will usually desert the roost. A jet of water from a garden hose is apotent disturber, particularly on frosty nights. Where water is not available, small Roman candles may be employed.

Though sparrows may be driven from a given neighborhood, the relief thus obtained is only temporary, and has the further objection that the nuisance is simply transferred elsewhere. More drastic action is therefore preferable.

— Prevention of Increase. —

The most effective method of preventing the increase of sparrows in a locality is to destroy their nests at intervals of ten 'or twelve days throughout the breeding season. Occasionally they build large covered nests in trees, but as a rule they build open nests in bird houses, electric-light hoods, cornices, water-spouts, and similar places. While it is often difficult to reach nests with the hand, they can usually be torn down by means of a long pole having an iron hook at the tip. By a concerted and continued movement to destroy every nest after the eggs are laid, English sparrows in any locality may be gradually reduced without resorting to shot or poison.

— Methods of Destruction. —

— At nests. —

The sparrow's habit of nesting in cavities can be turned to account against it. By providing one-room bird houses, or even packing boxes or tin cans, and putting them in trees or on poles or buildings at a height of about 10 feet, the birds may be captured after dark with the aid of a long-handled net. This net should have a deep bag and a small hoop made to fit the front of the boxes closely. After the net has been quietly placed over the entrance, a few raps on the box will send the tenant into it. Dilapidated buildings may sometimes be fitted up for catching sparrows in this way, as well as for destroying their nests and eggs. An ordinary wooden box may be nailed to the inside of the building over a hole made to admit the sparrows. The box should be arranged so that the top or upper part of the back can be lifted to gain access to the inside.

Its floor should be about 6 inches square and its height at the eaves about 8 inches. The roof should be hinged at the top for removing the eggs or young. Such boxes may be built of rough boards at slight cost. By distributing a number of them about orchards, shade trees, and outbuildings, and catching the sparrows that occupy them, or by destroying eggs, the work of extermination may by carried on at a season when other methods are least effective.

— Baiting. —

Preliminary to the following destructive measures, sparrows should be baited until they are attached to the spot selected for their execution. Seeds, grain, or waste from the table, if supplied regularly, will soon establish a feeding place. If a general campaign is to be undertaken, enough such feeding places should be maintained to attract to them practically all the English sparrows in the neighborhood. This can easily be done in winter when food is scarce. After thus baiting the sparrows they may be trapped, shot, or poisoned

— Trapping. —

Traps alone are inadequate to exterminate sparrows, but a reduction of numbers can be effected by using a shallow box not less than 4 feet square, open on one side and covered with woven wire on the other. One side of this trap rests on the ground, while the opposite side is supported by a stick 18 inches long. Near the upper end of this stick is attached a long cord, and between the top of it and the edge of the trap is placed a

chip. By setting the trap over bait and pulling the cord from a sheltered point of observation when a flock of sparrows is beneath it, numbers of them may be caught. Instead of the box described above, by which the birds are taken alive, an old door or similar device may be employed as a deadfall. In either case the trap should be kept set and baited until the sparrows are not afraid to go under it.

— Shooting. —

Sparrows are accustomed to feed in close flocks, and when thus assembled a large number can be killed by a charge of No. 10 shot. The best way is to scatter grain over long, narrow areas and shoot the sparrows at these baiting places. Where sparrows infest poultry yards, the bait may be placed on a horizontal board, supported at such an elevation that the birds can be shot without danger to the poultry.

—Utilization of Sparrows for Food.—

Since English sparrows are a pest and a reduction of their numbers is important on economic grounds, there would seem to be no reason why the birds, when trapped or shot, should not be utilized for food in his country, as they have been in the Old World for centuries. Their flesh is palatable and nutritious, and in city restaurants they are often served under the name of reed birds.

— Poisoning. —

Where the use of poison is not prohibited by law, it may be effectively used to reduce the number of sparrows. Of the different poisons tested, the most satisfactory is strychnia sulphate. It is easily prepared and acts quickly. Wheat has proved to be a good bait, as well as an excellent vehicle for administering the poison. The grain should be regularly supplied at the baiting stations until the birds have become accustomed to resort to the place. A good time to put it out is early morning, as the birds are sure to be hungry for breakfast. The capacity of the sparrow's crop and stomach is about 30 kernels of wheat, varying more or less according to the size of the kernels. 'In deciding the amount of poisoned wheat to put out at one time, it is well to estimate the number of sparrows frequenting a feeding place and to allow about 20 *kernels for each sparrow. Although 2 kernels of wheat coated with the solution described below have been known to kill a sparrows, 6 to 7 kernels are required to insure fatal results. Only as much poison should be put out as is likely to be eaten in one day, as exposure to moisture reduces its virulence. Furthermore, sparrows that take less than a fatal quantity, or that become frightened by the death of comrades, will forsake a feeding place if kept there constantly. It is better, therefore, to supply unpoisoned wheat after each poisoning until the birds have recovered confidence. An important advantage in having several feeding grounds is that they may be used in rotation, the sparrows forgetting their fear of one while the others in turn are receiving poison.

A poison mixture that has proved very effective is prepared as follows: Put one-eighth ounce of strychnia sulphate into three-fourths of a gill of hot water and boil until dissolved. Moisten $1\frac{1}{2}$ teaspoonfuls of starch with a few drops of cold water, add it to the poison solution, and heat 'till the starch thickens. Pour the hot poisoned starch solution over 1 quart of wheat and stir until every kernel is coated. Small-kerneled wheat sold as poultry food, if reasonably clean, is preferable to first quality grain, being cheaper and more easily eaten by the sparrows. A 2-quart glass fruit jar is a good vessel to mix in, as it is easily shaken and allows the condition of the contents to be seen. If the coated wheat be spread thinly on a hard, flat surface, it will be dry enough for use in a short time. It should be dried thoroughly if it is to be put into jars and kept for future use. Dishes employed in preparing poison may be safely cleansed by washing.

The poison should be well scattered, so that many birds may be able to partake at the same time, since after a few are affected their actions excite the suspicion of their comrades. Usually a few sparrows get only enough strychnine to paralyse them for a few hours, after which they recover. It is important, therefore, to visit the feeding places two or three hours after distributing poison to prevent such birds from escaping. It is well also to remove dead birds promptly to avoid exciting the suspicions of those that are unaffected. In northern latitudes the best time to put out poison is just after a snowstorm, when other food is covered. The feeding place should be cleared of snow and the poison laid early in the morning.

Sparrows should be baited in secluded places, safe from interruptions and where doves and poultry are not endangered. Roofs, back yards, and unused poultry runs are favorable situations. Proximity to low trees, grape arbors, and similar retreats has the advantage that sparrows go to such places between meals, and many dead birds will be found there well away from the bait. If undisturbed, poisoned birds will usually be found within a few feet of where the bait was spread, death occuring in from three to twenty minutes. Where doves or poultry are likely to be poisoned, the sparrows, after being baited, may be induced to feed in small covered pens made of coarsely meshed wire netting and having the sides raised about an inch and a half above the ground. There is practically no danger that cats or other animals will die from eating sparrows that have been poisoned. Any wheat coated by the above process, which is overlooked by the birds, will become harmless after a few rains.

The Farm

Keep Up-to-Date.

In no business is it more advisable that a man should keep thoroughly up-to-date than in farming. There is always something to be learnt by the most progressive farmers—something that means a financial profit. Almost every individual farmer does something better than his neighbours, even when he is not eminently successful, and for that reason it always pays for a farmer to get away at times from his own place and see what other farmers are doing. He is sure to learn something of value in connection with his business. It is safe to say that there are few men who would not learn a great deal by visiting some of our successful private farms. And it is one of the finest features of rural life that it is rare to find any disposition to refuse information. Our experience is that the vast majority of farmers are always willing to give others the benefit of their experience, and it is always worth obtaining. But it cannot be obtained by staying at home within one's own farm boundary. Of course, it is not always possible to get away from the farm, but nevertheless there is generally a slack time when a trip could be taken without wasting time and at little expense. As far as the latter is concerned, it would probably be covered many times over by what is learnt. There need, very often, be no necessity to go outside the district. If there is a man who has achieved success in certain lines—someone who has grown a profitable crop, for instance, when others failed in the locality—he should be worth a visit. Apart, however, from the case of exceptionally successful men, there is a profit in visiting almost any farm and comparing notes. There is always something to learn; while in every way it would be generally better if our farmers moved about amongst each other more than is so often the case now.—"Farm Life."

Feeding While Milking.

Most farmers claim that cows will stand more quietly and let down their milk more freely if they are given something to eat while they are being milked. But those who have adopted the plan of milking before feeding are seldom, if ever, anxious to go back to the old method of giving something to eat while they are being milked. Few cows seem to be able to divide their attention between the two operations. When the cow has nothing to attract her attention she stands quietly when she sees the milker approach. She also lets down her milk more freely than when she is attempting to eat at the same time.

The cow that has her head in the manger seldom sees her milker approaching, and the first intimation she has of his presence is when she feels the milking-stool against her flanks. If she has a nervous disposition, which is the case with most good dairy cows, she will either jump or kick, and then continue to annoy her milker by switching her tail until he has finished milking. If the cow is fed at the same time as she is being milked, she is in so great a hurry to get her feed that she becomes restless, and will not give down her milk freely. To make a change from the old practice of milking the cows while they are eating to feeding them after they have been milked will probably cause much restlessness on the part of the cows, but as soon as they become accustomed to it, which will not take long, they are much quieter than where both operations are conducted at the same time.—The New Zealand Farmer Stock and Station Journal.

Breeding Ayrshires.

(From "Hoard's Dairyman.")

Every so-called breed has its good qualities, in which it surpasses, in that particular, any other breed; and also has its defects, for nothing is absolutely perfect.

The good qualities of the Ayrshire cow are her ability to accommodate herself to the environment in which she happens to find herself; her vitality and strong constitution making her able to live and thrive under any conditions, and return a profit at the pail in proportion to the care bestowed upon her.

She is also an attractive cow to the eye, being of good size, weighing at maturity about one thousand pounds, red and white, of varied relative proportions of the red and white, handsome and stylish.

But the chief good quality of the Ayrshire cow is her ability to return the largest possible amount of dairy product for food consumed. She is a hearty and rapid feeder, not at all dainty in her appetite, but eating with

a relish whatever is placed before her, and when full is always chewing her cud, and doing it rapidly.

In the pasture she feeds the same eating greedily whatever is nearest, sweet feed, coarse feed, or browse, anything to fill up; consequently she always looks in fair condition, and always gives a good mess at the pail.

The Ayrshire cow is unsurpassed in the kind of milk she gives, being evenly balanced in the casein and fat thereby making it a well-balanced food, easily digested and adapted to the use of invalids and children. In cities and towns where the value of Ayrshire milk has been tested as a food for invalids and children, it is recommended by physicians as the only proper food for their patients.

Ayrshire milk is particularly adapted to the retail trade in cities and towns, as it will keep sweet a long time, will bear the churning of transportation, without separation of the butter, and reach the consumer in good condition. It has a good body and never looks blue.

It tests sufficiently high in total solids to pass the milk inspectors, and is the ideal table milk.

My personal knowledge of the dairy quality of the Ayrshire cow comes from my own herd, with weighing and testing the milk from each cow through a long term of years. In this herd of cows and heifers, running through twenty-six years, the average of milk is 6,493 pounds per cow.

Taking the above as the average capacity of the Ayrshire cow in the production of milk for the milkman, to what breed could I go for improvement without running a risk of losing some of the valuable points that make the Ayrshire cow second to none in the place where she is by nature and breeding peculiarly adapted, supplying a need and filling a want better than any other of the pure breeds, and she stands alone in satisfactorily producing a good quality of milk that pleases everyone that handles it, from the producer to the consumer.

Since I believe the Ayrshire cow to be as near perfection as possible in size, constitution, ability to assimilate food to the highest degree of profit in dairy product, a strong, healthy robust cow; it leaves only the outward conformation to be changed if desired, which is the easiest of all things to change in breeding.

The Ayrshire cow is quick to respond to influences of environment, quick to yield to the efforts of the breeder in changing to suit the whim or fancy of her owner, being by her nervous organism keyed to so high a tension that she can be moved at will by a skilful breeder. She has within the breed many specimens of outward perfection in all that goes to make a perfect cow.

The perfect cow is found in all the countries where she has been bred, and it needs only judicious selection to remedy any defects in her build, and it is not at all necessary to go outside the breed to find perfection in any point desired for change. We see this in the changes that have been made in her conformation and colour, her style of horn and shape of udder, as well as her length of teat. She adapts herself to the needs of her owner in whatever country she finds her home.

If he wants white colour, she gives him white calves; if he wants an upright horn, it quickly appears in her offspring; if he wants long teats for his men to milk, it is all right, and her calves come with good long teats, and she just as readily gives him short ones for the dairymaid. I have been surprised at the quickness of the change in imported cows in regard to the hide and hair becoming softer and the hair finer and shorter, after being on this side the water a while, owing, no doubt, to the different climate and stable care.

The only point that can be criticised in the Ayrshire cow for utility in the dairy and for the convenience of the milkman, is the teat, and this is easily conformed to the desire of the milker by a skilful breeder, and within the limits of the pure bred Ayrshire.

An intelligent and careful breeder will not place a bull at the head of his herd without carefully informing himself in regard to the female lines of ancestry that lie back of the proposed bull. No good breeder will use a bull that has a dam with short teats, and if he is wise, he will see to it that his bull has a grand-dam with long teats also, and the more careful he is the further back in all the female lines will he investigate.

There are Ayrshire cows in Scotland, in Canada, and in the States, that for generations have been bred to correct this defect, and it is not a difficult matter to obtain a bull that is strongly prepotent in this point; but it requires research and care exercised most advantageously to accomplish, and it can be done in a generation or two by a proper selection of bulls to top the herd, and all within the limits of the thoroughbred Ayrshire cattle.

A Lecture About Brood Mares.

One of the first things a farmer wants to know as foaling time approaches is what mares are in foal, and although in some cases there can be no doubt, in many others he does not find it easy to decide.

On making inquiry among his neighbours he finds the methods of testing this matter are both diverse and peculiar, from pouring water into the ears to giving the mare sharp exercise, followed by a drink of cold water, to make the foal jump.

The signs of pregnancy in the mare are the following :—

1. Cessation of heat is the earliest sign of pregnancy, but it must not be too implicity relied upon, as it is subject to great variation.

1. Enlargement of the abdomen usually commences three or four months after conception, but in some cases, especially in mares with their first foal, the enlargement is by no means apparent until very near foaling.

3. Enlargement of the udder in mares with their first foal occurs between two and three months after conception.

The udder becomes rounded, loses its wrinkles, and the teats become prominent.

This enlargement subsides, and reappears again several times during pregnancy.

This sign of pregnancy I regard as a certain one, it is well marked in mares carrying their first foal, and is often, too, seen in older mares. However, as it does not inconvenience the mare it often remains unnoticed.

4. A disposition to lay on fat and an increase in weight is, of course, a well-known sign of pregnancy.

Positive evidence of pregnancy is obtained by manipulation through the abdominal wall, the vagina, or the rectum.

5. In the first place the palm of the hand is passed just below the flank and 10in. in front of the stifle on the left side. If pregnancy is advanced a hard mass is felt, and the movements of the foal are perceptible.

When applying this method the closed fist should not be forcibly punched against the foals head, as I have often seen done, because it is very possible to produce abortion by violence of that kind.

6. Examination through the vagina is not of much value in mares, and the method called ballottement is, on account of the horizontal position of the body, altogether useless.

7. Auscultation (from the Latin auscultare, to listen), with a view to the detection of the pulsations of the foal's heart, is, on account of the marked intestinal sounds and thickness of the abdominal wall, of little service in the mare.

I have, however, on a few occasions recognised the foetal heart sounds on examining throughbred mares, but never in coarser bred animals.

The uterine souffle, caused by the blood passing through the enlarged uterine vessels—a whirling sound—and the funic souffle, caused by the pulsation in the umbilical cord, are to be readily detected in small animals, but cannot be recognised in mares.

8. Examination through the rectum is one of the best and most certain of all methods for recognising pregnancy in mares.

The rectum is emptied of its contents, and the hand passed over the brim of the pelvis. The palm of the hand is then pressed downwards, and the uterus with its contents may be felt immediately below.

In the early stages of pregnancy it may be necessary to raise the abdomen by passing a sheet under it, and pressing it upward, but a little experience soon enables one to do without this on most occasions.

If the foal is over the mid-term of pregnancy, the hand usually meets with the top of his head, or sometimes, if the hand is well advanced, with the knees, and he makes a slight movement under the hand. The foetus should not be pressed upon or manipulated in any way, but as soon as his presence is known the hand should be at once withdrawn, or much damage may result.

The position of the foal as he lies in the uterus before labour commences is not as you see it in most of the fearful and wonderful books on amateur horse-doctoring.

Throughout the whole time the foetus is developing in the uterus it lies upon its back, curled round with the head bent down to the breast, the legs are doubled, and the knees rest on either side of the face.

When parturition commences what takes place first of all is that the womb makes certain convulsive contractions.

These contractions first turn the foal on to his side, and finally reverse his former position altogether.

This treatment drags the umbilical cord, for this cord is attached to that portion of the placenta which occupies the upper part of the womb.

A few more convulsive contractions of the uterus cause the foal to kick out and straighten his fore legs, and this action in normal parturition bursts the enclosing membranes, and the foetus is then quickly expelled.

This is what normally takes place.

All kinds of abnormalities occur, and in connection with the rupture of the membraneous envelopes of the foetus I have seen on several occasions the outer membrane chorion assume such a thick and tough condition that it had to be cut through as the foal could not burst it and the fingers could not tear it.

I remember one case of this kind, to which I was called in a great hurry, where the owner thought the womb was coming out (and indeed it looked very like it), and had put on a most complicated sort of truss of ropes and straps to keep it in. In this case the uterine contractions were so strong and labour was so advanced that the mare would have expelled the foal enclosed in the membranes had she been allowed to stand or lie, but she was kept moving about by the aid of a strong man and whip. As soon as I allowed the mare to stand, and took off the truss, the foal was expelled with the membranes intact; and in such cases as these, if assistance is not at hand, of course the foal must die suffocated, because respiration becomes necessary as soon as the umbilical cord is broken.

— Impediments to Birth. —

These are very varied, and depend more frequently upon some abnormal size or position of the foal than disorders of the organs of the mare.

The various positions which foals assume where there is a departure from the normal presentation form the most common obstruction to birth, and are more or less serious according to the difficulty of sufficiently altering the position to extract the foal.

There is hardly any conceivable position a foal cannot be found in these cases at times, but the most common are—

1. The forelegs presented, but the head turned back over the shoulder.

2. The head presented but the legs not extended.

3. All four legs presented and the foal lying sideways.

4. Lying on the back.

5. Tail only presented and the legs below the brim of the pelvis.

1. Here the head must be got round and the neck straightened, in most cases. I have extracted foals with the head curled round, when they were dead and the neck almost immovable, by passing a cord round the neck and removing the whole leg at the shoulder; but the head should be got round whenever possible.

2. The legs must be raised, brought into the passage, and corded. To effect this it is usually necessary to push back the foal as much as possible to allow room for getting up the legs.

3. This is a very bad presentation if any time be lost in making ineffectual effort. It is necessary to rapidly find out which are fore and which are hind legs, push back the fore legs as far as possible, and extract by pulling on the hind ones.

4. In these cases the foal is usually dead, and the quickest delivery is effected by placing a cord round the neck, one round each of the fore legs, and extracting by ordinary traction.

5. This is often a troublesome presentation, and the foal must be pushed back as far as possible and the legs got into the passage, corded, and extracted in that way.

To extract a foal by the hind legs is far easier than by the fore ones, because the head does not require any attention, as it can then offer no obstruction.

In these cases, however, of what are called breech presentations, the difficulty is in getting up the legs. That done there is no more trouble.

There are many other presentations I have no time now to go into, but none of them make extraction of the foal impossible.

When other means fail, the operation of embryotomy, or dismemberment of the foal, can be rapidly performed by a skilled and experienced practitioner, and there is no reason why so many mares should be lost in foaling as there are in this colony. With mares, however, time is of great value, and the more gentle and considerate the operator is to his patients the more successful will be his results.

These cases, as I know from several years' practical experience, are often laborious and exhausting to the practitioner. They require determination, coolness, a fair amount of muscular strength and endurance, a rational sympathy with the patient and a good practical knowledge of the work.

— Retention of the Placenta. —

The placenta, or membrane which corresponds to the inner surface of the womb, and which contains the vessels through which nutrient elements pass from the dam to the foetus, normally is expelled in the mare either at the time of birth or immediately after it.

It is retained in the mare most frequently in cases of abortion or when the birth has taken place several days before the normal average time.

It cannot be allowed to remain in the mare with impunity so long as it may in the cow. In the mare retention is always more or less dangerous, and, owing to its diffuse character, its rapid decomposition, and the readiness with which septic organisms obtain entrance to the system, it should never be allowed to remain more than a few hours.

Injection of lukewarm water will materially facilitate the separation of the placenta, but if this is not effected the best way is to thoroughly wash the hands, first with soap and water, then in spirit, and finally dress them with carbolised oil.

One hand should be inserted as far into the womb as possible, and the placenta peeled off all parts which can be reached.

Making Machine Tests.

In 1909 and 1911 trials with a well-known milking machine of the suction type were carried out to test its efficiency, to see if machine-milked cows become "dry" sooner than hand-milked ones, and to observe the effect of the system of milking on the chemical composition and on the purity, from a bacteriological point of view, of the milk.

In each year one group of cows was milked as completely as possible by machine, and then striped by hand (it was found impossible to reduce the strippings to less than 1½ to 2lb. from a cow yielding 20 lb. of milk); the other group was milked entirely by hand. In 1909 the average fall over a period of ten weeks in the milk yield of machine-milked cows was 26 lb. a week, as compared with 21.6 lb. a week in the case of hand-milked cows. In 1911 it was not possible to prolong the test for more than four weeks, and in this period the average weekly decline in the yield of milk given by the two groups of cows was the same.

As regards the fat content of the milk, there was practically no difference between that obtained by the two systems, though it must be remembered the cows were stripped by hand after the machine.

To test the cleanliness of the milk obtained in the two ways, separate cheeses were made, and also direct bacteriological examination was carried out. In the first season, when the machine was run without special care and under conditions similar to to those which would obtain on an ordinary farm, the milk was often of a bad flavour, and unless special precautions were taken in making, the resulting cheese was inferior in flavour and quality. In the second series of trials the machine was placed under the charge of a skilled person, and special measures, such as soaking the teat-cups in various solutions, were adopted to keep the important parts clean. As a result of this there was a marked improvement in the cleanliness of the milk, and cheeses with a better flavour than before were obtained.

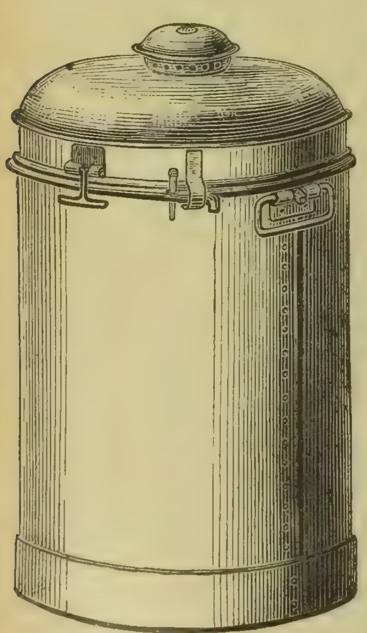
It was found that the number of bacteria in machine-drawn milk was greater than in the hand-drawn milk. A curious feature of the machine-drawn milk was that, although it contained sometimes as many as ten times the number of bacteria in hand-drawn milk, it took longer to ripen. It is pointed out that the total number of bacteria present in milk was not by itself a reliable guide, as many of the organisms had no action on milk.

The chief disadvantages of the machine appeared to be the great difficulty of keeping various parts of the machine in a suitably clean state, and the apparent impossibility of preventing the teat-cups falling off during the milking, with resulting loss of time and contamination of the milk.

Lockjaw in Horses.

This is usually found to be due to the following causes:—1. Unskilful treatment of wounds. 2. Castration of colts and lambs with dirty hands and instruments; also by placing the animals operated on in bad surroundings, i.e., dirty yards. The germs of tetanus are very common in nature, and can be found in old cultivated soils, manure heaps, and old yards.

This micro-organism (germ) will not grow or develop any poisonous substance in an open wound, as it cannot flourish in the presence of air. Punctured wounds, in which dirt carrying the ger mof tetanus has entered the tissues, are the frequent cause of the disease. Where an open wound has been unskilfully treated, or the animal has been operated on in a dirty yard, or dirty hands and instruments used in operations—these are the common causes for infecting what might be a simple wound under ordinary conditions. The germs do not



Readers! Can you write u something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.

multiply and produce their poison until the wound has healed, that is, until the presence of air has been excluded. Wounds of the mouth, the jaws, and digestive tract are not the common parts for the entry of this germ. The horse is the animal most prone to this disease, which causes a deathrate of over 90 per cent.

Prevention.—In all operations, no matter how simple, wash the part to be operated on with hot water and washing soda, clean the hands and finger nails with the same solution, and boil the instruments. The animals to be operated on should be secured on a clean grass plot, and not in dirty yards covered with manure or loose dust. Open wounds should be kept clean with hot water and washing soda. Do not use any oily preparations or embrocations that dry up the part and leave a lasting blemish.

Treatment of Affected Animals.—Place the animal in a dark loosebox, well bedded with straw. All light must be kept out. The loosebox should be in a very quiet place. Disturb the patient as little as possible. Keep a supply of cold water in the manger. If the horse can suck up fluids give gruel, hay tea, and water in which oats or wheat has been boiled. Giving medicines, except by a duly qualified veterinary-surgeon, only hastens the death of the affected animal. —Journal of Agriculture.

Prepotency.

In Bulletin No. 241 of the Michigan Experiment Station, which deals with a Plan for the Improvement of Michigan Cattle, we find a very clear and good definition of prepotency.

The bulletin contains many other valuable suggestions to breeders, which we will not mention at this time, for we wish to make clear what is meant by prepotency. The bulletin reads as follows:—

What is prepotency? "Strictly speaking, prepotency is the superior power which one parent has over the other in determining the character of the offspring. But the term is more commonly used to indicate that power which an animal has to transmit its own qualities." "If a pure male were to beget progeny from females of the same breed, which bear a close resemblance to the male parent, this result would be a stronger evidence of prepotency in the male, than a similar result produced by mating him with females of mixed breeding, since the resistance to modification in the progeny of the females in the first instance, would be stronger than resistance to the same influence in the second instance." This quality in a sire is one of the most important factors stimulating rapid improvement in any process of upgrading. It is more important in the sire than the dam, as the effect on the sire's side is more far-reaching. Probably one of the most difficult things in animal breeding is to determine whether the sire is possessed of prepotency or not.

It is conceded by some, that prepotency is the result of certain lines of breeding, and that certain visible characteristics must accompany it. The following are some influences tending to produce prepotency, viz.: (1) duration of purity of breeding without admixture of alien blood; (2) uniformity of type and results from animals in pedigree; (3) inherent vigour of type, race or individual; (4) line breeding. To illustrate the first point: It is well known that it matters little with what breed or type a Holstein bull is mated, the offspring is almost sure to resemble the sire markedly in characteristics, and particularly in colour; it is doubtful if any breed of cattle has been bred pure for a longer period than the Holstein, and the inherent vigour of the breed is indisputable. The ability of the Hereford, also, to transmit uniformly its characteristic colour markings, especially the white face, is an evidence of prepotency, the result of a long period of pure breeding. In selecting a prepotent sire, it is well to study the pedigree and ascertain, as far as possible, what is known relative to the performance of the ancestry as breeders, for an animal the progeny of prepotent ancestry is certainly likely to be more prepotent than an animal whose ancestors have not been prepotent.

"Ropy" Milk.

Of all the abnormal changes which sometimes takes place in milk, one of the most common and persistent is what is called "ropy" or "slimy" milk. Such milk, when poured from a jug, has a rope-like form. A spoon or wire dipped into the milk and then taken out draws after it thread-like strands sometimes over a yard in length. Such an abnormal appearance naturally alarms the consumer, while the persistence of the trouble frequently causes great loss to the milk vendor.

— Cause of Ropiness. —

The appearance of ropiness in the mixed milk of a herd several hours after milking, is due to the growth of bacteria, which, as a general rule, gain access to the milk after it has left the udder ofthe cow, though in a few instances, they may exist in the cow before milking.

— Garget Milk. —

Ropiness is sometimes observed in milk from individual cows, notably in cases of inflammation of the udder. In such cases the cause may be either bacterial or non-bacterial. If the ropiness does not increase as the milk is kept and cannot be propagated by transference into another sample of fresh milk, it is probably due to the presence of fibrin and white corpuscles from the blood, which form masses of slimy material in the milk. Such milk is known as garget milk.

Although garget milk may not cause other milk to become ropy, organisms are present in the milk which may lead to infection being spread from one cow to another by the hands of the milker. For this reason prompt attention should be given to all cows suffering from this disease, and all sources of infection removed.

Weeds and their Suppression.

— What is a Weed ? —

Any plant growing where it is not wanted is a weed. It matters not if the plant in question is in general a useful one ; so long as it occupies ground which is intended for growing other crops it must be classed as a weed. According to this definition it will be seen that wheat, rape and potatoes are weeds if growing amongst other crops where they were not sown intentionally. This should not be forgotten, although the term weed is usually associated with plants which are never intentionally cultivated.

— Dangers of Weeds. —

The most serious objections to weeds may be stated in few words as follows :—

1. They absorb from the soil moisture and manures which would otherwise go to nourish and increase the crop which is being cultivated.

2. They "crowd" the crop, screening it from obtaining an adequate amount of light, which is necessary for healthy growth and for the proper assimilation of the soil and air constituents. The effect of this screening is to hamper the growth of the plants during early life, especially in the case of crops of slow growth.

3. Many weeds pull down cereals, or assist in their downfall, rendering the work of harvesting difficult and expensive.

4. Weeds may harbour, or favour the development of insect pests, or they may temporarily harbour rusts and mildews, which spread to the cultivated crops later.

5. The pecuniary value of samples of cereals is reduced by the presence of weed seeds and the market value of hay and other farm produce is similarly lowered by certain weeds or their seeds.

6. Some weeds taint the milk of cows which have fed upon them, whilst others are poisonous to stock.

Most farmers recognise that it is impossible to obtain the best returns from the land when weeds are allowed to grow unchecked. Few, however, may be aware that in many cases the yield in crop on even a moderately weeded area may be from 40 to 50 per cent. higher than on a similar unweeded area.

— Manner of Distribution. —

Before the suppression of weeds can be intelligently dealt with, it is essential to have a clear conception as to the manner in which weeds obtain access to the farm, and the methods by which they are spread broadcast amongst cultivated crops. The manner of distribution is very varied, amongst the commoner processes being :—

(a) Distribution effected by means of the wind, many seeds, like those of the poppy, being so small that they are readily scattered considerable distances from the parent plant.

(b) Special parachute-like apparatus, or other arrangement, of fluffy hairs and flattened wing-like projections, by which the seeds, such as those of the thistle, dock, groundsel, etc., are rendered buoyant, and easily carried about in a light breeze.

(c) Direct sowing over the land, or indirectly by being brought on to the farm in inferior hay, and so spread by means of farmyard manure.

(d) Screenings from thrashing-machines, sweepings from barns and hay-lofts, etc., often find their way to the manure heap, and as many seeds of weeds may be uninjured by the heat of fermentation, they will in due course pass to the fields. Some seeds may even germinate better after lying in the manure heap, or after passing through the stomach of an animal.

(e) The use of impure seed is a potent means of introducing weeds to a farm. The presence of 1 per cent. of dock seed in a mixture of grass and clover seed means ten or more dock plants per square yard all over the field wherever such a sample is sown at the ordinary rate.

— Meehods of Suppression. —

Having obtained some insight into the manner in which weeds are spread it is possible to devise some general principles upon which their suppression should be based. But it must be emphasised that, whatever methods are proposed, they should be promptly, vigorously and faithfully carried out : systematic well-timed effort is the foundation of efficiency.

1. The most obvious mode of suppressing weeds is to prevent their seeding. When it is recognised that an ordinary charlock plant produces more than 1,000, and a moderate-sized poppy at least 10,000 to 15,000 seeds, the force of the adage that "one year's seeding is seven years weeding" is obvious. Further, as many weeds produce seeds which do not germinate uniformly, the mischief is greater than at first sight appears, for they may lie dormant in the soil and come up subsequently at inconvenient times.

2. Under no circumstances should imperfectly cleaned seed by either purchased or sown. At the same time care should be exercised as to the disposal of screenings, sweepings of haylofts, etc. Such refuse should be thoroughly scalded before giving to stock, or burnt.

3. Deep ploughing is sometimes resorted to with considerable success, many seeds rotting when deeply buried. Others, however, remain dormant under such conditions, without losing their vitality, and may subsequently be brought to the surface. Shallow cultivation and the preparation of a good tilth are more advisable, as by this means the seeds are encouraged to germinate, when they may be destroyed by further stirring of the soil. Such a method, taking care to keep the seeds near the surface, will clear the ground of many annual and biennial weeds, such as poppy, charlock, and some species of thistle.

4. The eradication of perennials needs careful and well-directed effort. These plants are propagated by underground runners bearing buds, and the best treatment where they are concerned is shallow ploughing and thorough cultivation, the weeds being collected and burnt. Or the weeds may be brought to the surface and left to the drying effects of wind and sun.

5. Hand-pulling and total removal of weeds is the most efficient means of destruction. Digging with fork or spade, or collection by means of the harrow after being loosened with the plough may also be adopted, but these methods are all expensive, and only resorted to when other plans have failed or are inapplicable. In every case collected weeds should be burnt.

6. Judicious cutting with spade, hoe, or scythe, will destroy all weeds, but ill-timed cutting may only encourage what it is desired to suppress. Many weeds when cut near the ground send up new stems, and these are produced at the expense of food stored below ground in the previous season. The growth of these secondary stems weakens the plant as a whole, and if, when produced, they are immediately cut off, and the process repeated, total destruction will be the result, no matter what the plant may be. The first cutting should be early in the year, and as often after that, throughout the summer, as new shoots appear. If left too long they may either seed, or again store up food in the roots in preparation for the next season's growth. One cutting in the case of perennials is quite valueless.

7. Rushes, sedges and horsetails are indicative of a sour soil, and this can only be remedied by draining.

8. The application of manure and artificial fertilisers induces considerable changes in the character of the herbage on pastures, and of the weeds on arable land. For example, nitrogenous manures stimulate the growth of useful grasses. The sour condition of the surface soil can be partially remedied by a dressing of lime. The application of 5 to 8 cwt. of basic slag per acre to pastures on stiff clay land often has a wonderful effect in generally improving the herbage.

9. Close feeding with sheep will often check certain plants and prevent them seeding.

10. Finally, spraying crops with chemical substances, more especially with sulphate of copper (bluestone) and sulphate of iron, has been found exceedingly useful in destroying weeds in young crops.—Leaflet 112, British Board of Agriculture.

Soil Inoculation for Lucerne.

It has long been known that in introducing new leguminous crops, such as lucerne, etc., it is extremely advantageous to distribute soil from a field, in which the particular plant has been grown successfully over the land to be sown with the crop. In America this practice has been very largely employed in recent years for establishing new fields of lucerne. For instance, in a large number of experiments carried out by the New York Experiment Station it was found that when 200 to 300 lbs. per acre of old lucerne soil were used with about half a ton of lime, successful results were obtained in four of every five cases. When the lime was used alone a satisfactory plant was obtained in only two out of every five cases. Apart, however, from the cost of carrying large quantities of soil, there is in some cases a possibility of spreading seeds and spores of weeds and diseases in the soil, and from these points of view pure cultures are preferable to soil as inoculating material. In order to compare the result of inoculation by soil with that by pure culture a series of experiments was carried out. From results obtained in field trials it is seen that without lime, inoculation either by soil or pure culture produced no effect. Lime alone produced a considerable effect. The pure culture was not so effective as soil.
—Exchange.

The Life of a Tree.

The object of forestry is to discover and apply the principles according to which forests are best managed. It is distinct from arboriculture, while deals with individual trees. Forestry has to do with single trees only as they stand together on some large area whose principal crop is trees, and which therefore forms part of a forest. The forest is the most highly organized portion of the vegetable world. It takes its importance less from the individual trees which help to form it than from the qualities which belong to it as a whole. Although it is composed of trees, the forest is far more than a collection of trees standing in one place. It has a population of animals and plants peculiar to itself, a soil largely of its own making, and a climate different in many ways from that of the open country. Its influence upon the streams alone makes farming possible in many regions, and everywhere it tends to prevent floods and drought. It supplies fuel, one of the first necessaries of life, and timber, the raw material, without which cities, railroads, and all the great achievements of material progress would have been either long delayed or wholly impossible. The forest is as beautiful as it is useful. The old fairy tales which spoke of it as a terrible place are wrong. No one can really know the forest without feeling the gentle influence of one of the kindliest and strongest parts of nature. From every point of view it is one of the most helpful friends of man. Perhaps no natural agent has done so much for the human race and has been so recklessly used and so little understood.

Bulletin 175, U.S.A. Dept. of Agriculture, contains the following interesting study of tree growth:—

— The Parts of a Tree. —

In order to rightly understand the forest, something must first be known about the units of which it is made up. A tree, then, is a woody plant growing up from the ground usually with a single stem. It consists of three parts: (1) The roots, which extend into the ground to a depth of three or four feet, or still farther when the soil is not too hard and they do not find moisture enough near the surface; they hold the tree in place and take up from the soil water and certain mineral substances which the tree needs in its growth; (2) the trunk or stem which supports the crown and supplies it with mineral food and water from the roots; (3) the crown itself, with its network of branches, buds, and leaves, in which the food taken up by the tree from the soil and air is worked over and made ready to assist in the growth of the whole plant.

The crown has more to do with the life of the tree than its other parts, for the most important processes in the reproduction of the tree and the digestion of its food takes place in the crown. For this reason, and because we can control its shape and size more easily and directly than that of the roots or trunk, the crown is of special interest to the forester. It is almost exclusively with the crowns that he has to deal in tending a crops of trees and preparing the way for the succeeding generation. As they stand together in the forest, the crowns of the trees form a broken shelter, which is usually spoken of as the leaf canopy, but which may better be called the cover.

— The Food of a Tree. —

The materials upon which a tree feeds are derived from the soil and the air. The minute root hairs which spring from the rootlets take up water from the ground, and with it various substances which it holds in solution. These are the earthy constituents of the tree, which reappear in the form of ashes when any part of it is burned. The water which contains these materials goes straight from the roots to the leaves, in which a most important process in the feeding of the tree takes place. The process is the assimilation or taking up and breaking up, by the leaves, of carbonic-acid gas from the air. It goes on only in the presence of light and heat, and through the action of chlorophyll, a substance from which the leaves and the young bark get their green color.

— Chlorophyll. —

Plants containing chlorophyll are the chief means by which mineral materials are changed into food, so that nearly all plant and animal life depends upon them. Plant cells which contain chlorophyll break up the carbonic-acid gas with which they come in contact, retain the carbon, one of its elements, and send back the other, oxygen, into the air. Then, still under the influence of the sunlight, they combine the carbon with the oxygen and hydrogen of the water from the roots into new chemical compounds, in which nitrogen and the earthy constituents mentioned above are also present; that is to say, the food materials which reach the tree through the roots and leaves are first digested in the leaves somewhat as food is digested in the human body, and are then sent to all living parts of the roots, stem, and crown, where they pass through another process of digestion, and are then either used at once in growth or stored away until the proper moment arrives. This is the general rule, but it is believed that in some cases food taken up by the roots can be used without first being digested in the leaves.

— The Composition of Wood. —

Wood is made chiefly of carbon, oxygen, and hydrogen. When perfectly dry, about half its weight is carbon, and half oxygen and hydrogen, in almost the same proportion as in water. It contains also about 1 part in 100, by weight, of earthy constituents, and nitrogen to the same amount. When wood is burned, all these materials disappear into the air except the earthy constituents. Now, the nitrogen and water taken up by the roots were in the air before they reached the ground. It is true, therefore, that when wood is burned those parts of it which came from the air go back into it in the form of gas, while those which came from the soil remain behind in the form of ashes.

— How the Tree Breathes. —

Besides giving out oxygen in assimilation, trees also take in oxygen from the air through their leaves, and through the minute openings in the bark called lenticels, such as the oblong raised spots or marks on the young branches of birch and cherry and many other trees. All plants, like all animals, breathe; and plants, like animals, breathe in oxygen and breathe out carbonic acid gas. This process of respiration or the breathing of the tree goes on both day and night, but it is far less active than assimilation, which takes place only in the light. Consequently more carbonic-acid gas is taken into

the tree than is retained to be used in growing.

— Transpiration. —

The leaves give out not only the oxygen derived from the decomposition of carbonic-acid gas taken from the air and carbonic-acid gas produced in breathing, but also great quantities of water vapor. The amount of water taken up by the roots is very much larger than is required to be combined with carbon and the earthy constituents in the leaves. In order that fresh supplies of earthy constituents in solution may reach the leaves rapidly the water already in them is ejected by transpiration, which is the evaporation of water from all parts of the tree above ground, but principally from the leaves. Even where the bark is very thick, as on the trunk of old oaks and chestnuts, transpiration goes on through the lenticels in the bottoms of the deep cracks. It sometimes happens, especially in spring before the leaves come out, that transpiration can not get rid of the water from the roots as fast as it rises, and that it falls in drops from the buds, or later on even from the leaves themselves.

— The Growth of a Tree. —

The addition of new material in the way described in the preceding pages is the foundation of growth. Except in the buds, leaves, fruit, and the twigs less than a year old, this material is deposited in a thin coat over the whole tree between the wood and the bark. The new twigs are in length by a kind of stretching, but only during the first year. Thus it is only by means of these youngest twigs that a tree increases in height and in spread of branches. After the first year their height is fixed, younger twigs stretch out from the buds, and the older ones grow henceforth only in thickness. The fresh coat of new material mentioned above covers them year by year. There are two layers in this coat, separated by a third one of tender forming tissues called the cambium, in which the actual making of the new substance goes on. The inner side of the cambium layer forms new wood, the outer side new bark. Besides the true cambium, which forms both wood and bark, there is another cambium which makes the corky outer bark and nothing else. This cork cambium may encircle the whole tree, like the true cambium, or it may form little separate films in the bark, but in either case it dies from time to time, and is re-formed nearer the wood.

— The Structure of Wood. —

Wood is chiefly made up of very small tubes or cells of various kinds, which have special uses in the life of the tree. Some conduct water from the roots to the crown, some store away digested food, and others merely strengthen the structure of the wood and hold it together. The wood of cone-bearing or coniferous trees (like the pines and spruces) has but few kinds of cells, while that of the broad-leaf trees (such as oaks and maples) is much less simple. But in each case some of the cells have thick walls and small openings, and others wide openings and very thin walls. In climates which have regularly one season of growth and one of rest, like our own, the cells of the layer of new wood formed each year at the inner surface of the cambium are arranged in a definite way. When growth begins in the spring, and the fresh twigs and leaves put out, there is a great demand for water in the crown to supply these moist green new parts of the tree. Water rises in most trees through the newer layers of the wood, and especially through the last ring. Consequently, at first the tree makes thin-walled cells with wide openings, through which water can rise rapidly to the ends of the branches. Later on, when the demand for water is not so great, and there is plenty of digested food to supply building material, the cells formed are narrow and thick-walled. Thus the summer wood in each year's growth is heavier, stronger, and darker in color than the spring wood. In the wood of many broadleaf trees, such as oak and chestnut, the spring wood is also marked by a band of open tubes of larger size called ducts. In others, such as maple and beech, these ducts are scattered through the whole season's growth, and in all conifers, as for example the pines and cedars, they are entirely wanting. But the differences in hardness and color between the growth of spring and summer are still present. It is sometimes possible to see the line which separates the growth of two seasons in the bark, as in the case of common cork, which is the outer bark of the Cork Oak, a native of southern Europe.

If the trunk or branch of an oak tree is cut smoothly across, thin whitish lines may be seen running from within outward. Some of these lines begin in the centre of the tree and others in each one of the annual rings. These are the medullary rays, which make the silver grain in quartered oak and other woods. They exist in all kinds of trees, but in many—as, for example, in most conifers—they are so fine as hardly to be seen with the naked eye. Seasoning cracks which run across the rings of growth always follow the lines of these rays, while others most often follow along some annual ring.

(To be Continued).

The General Feeding Characteristics of Different Classes of Stock.

The outstanding difference in the feeding characteristics of the various classes of stock lies in their relative powers of digesting and utilising the coarse, fibrous foods of the hay and straw type.

Such foodstuffs are dealt with most effectively by the ruminant animals (cattle and sheep), since they are equipped with the necessary powers of mastication and capacious digestive organs. Pigs, on the other hand, cannot deal effectively with any but the softest types of fibre, such as are met with in juicy, green food; whilst horses occupy an intermediate position in this respect. Thus the horse will masticate and digest good hay almost as successfully as cattle, but will be less successful with the harder type of fibre met with in straw.

Young animals, even cattle, are not adapted to deal with fibrous foods until their digestive powers have been well developed by feeding with easily-digested foods, of which the mothers' milk is incomparably the best and safest. Even then the introduction of coarse food into a diet must be very gradual and left largely to the instinct of the animal. The further feeding characteristics of the various classes of stock may be conveniently discussed separately.

— Young Animals. —

The growth of the young animal is essentially a rapid production of nitrogenous matters (muscle, etc.) and bone. Hence the prime consideration in the food ration must be a sufficiently liberal supply of digestible albuminoids, and of the bone-forming mineral ingredients (lime and phosphates). Further, it is desirable that any food given with the milk, which will form the basis of the ration during the early months of the young animal's life, shall be, like milk, comparatively rich in albuminoids and oil, and easily digested.

As the animal grows the special requirement for albuminoids decreases steadily in proportion to its total food requirements, and the ration may be correspondingly adjusted to be poorer in albuminoids and richer in carbohydrates. In the case of young stock growing up under natural conditions this adjustment is effected spontaneously. For example, calves or foals running on grass with their dams make the adjustment by steadily increasing the amount of grass eaten in proportion to milk consumed. Where animals are reared under more artificial conditions, the adjustment must be made very gradually. It will always be safer to err on the side of liberality in the supply of albuminoids to growing animals.

The quantity of food required by the young animal increases, of course, with the growth of the animal until it attains full growth, after which no further gain in weight takes place unless fattening conditions are resorted to.

A further matter that demands attention in the feeding of growing animals is the supply of mineral ingredients in the food, and especially of lime and phosphates, since these enter so largely into the composition of the bones. Cases of bone trouble in young stock, especially pigs, have frequently been traced to deficiencies in this respect.

Suitable facilities must be provided for exercise in order to ensure full development of the muscles and bones, and general soundness of constitution.

In all matters relating to the treatment of young animals their welfare and comfort should be objects of special care, all harshness or irregularity being avoided.

To sum up, it is of fundamental importance in the rearing of young stock that all the conditions of feeding, treatment and environment shall be such as to favour natural development. So far as the food is concerned, this should be liberal in quantity, well supplied with albuminoids, oil and useful mineral matters, of the best quality, and thoroughly suitable in every way.

Many feeders modify the treatment of young stock according to the purpose for which they are subsequently intended, a somewhat heavier and richer ration being given to those that are subsequently to be fattened when full-grown than to those that are to form the future breeding stock. In the former case the qualities desired are size and early maturity, whereas in the latter other qualities are desired which a tendency to fleshiness would in most cases be likely to impair, e.g., the milk-yielding propensities of heifers.

— Fattening Young Stock. —

The fattening of young animals affords a somewhat different case from the simple rearing of the animal to maturity. In the former case it is necessary to secure a production of fatty tissue alongside the normal growth of the animal. This is effected by a more liberal feeding and more restricted exercise.

The fattening increase is largely composed of fat, so that the extra food need not be specially rich in albuminoids. In this respect it should be intermediate in character between that supplied for purposes of growth solely and that given for fattening purposes to a full-grown animal of the same class. In other respects the conditions outlined above should be closely observed.

— Fattening Adult Animals. —

The fattening of full-grown animals is mainly a conversion of food into body-fat, very little albuminoid matter being contained in the fattening increase. The additional food required in excess of the maintenance ration (i.e., the ration required to keep the animals in "store" condition) may therefore consist largely of digestible oil, carbohydrates, and fibre.

Animals that are in poor, lean condition at the outset of fattening should receive a more liberal supply of albuminoids for a few weeks than those which start in

fair condition, in order to ensure that the fleshy tissues shall be fully developed and made capable of storing up large quantities of fat.

In deciding what concentrated foods shall be included in the ration, any influence that they are known to exercise upon the quality of the carcass should be kept in mind. Thus, maize, rice-meal, oats, and linseed cake have a softening tendency upon the fat, whilst cotton cakes, peas and beans have the opposite effect.

In order to obtain the best results in fattening, it is necessary that the activities of the animal shall be confined as far as possible to the consumption of food. It is necessary, therefore, to restrict greatly the facilities for exercise. The provision of abundant litter will also contribute to the same end, by inducing the animal to lie down more frequently, as will also all other measures that promote its comfort.

— Working Animals. —

The requirements of the working animal, so far as the composition of its ration is concerned, are in the main similar to those of the fattening animal, since under normal conditions, muscular energy is chiefly generated from the carbohydrates and oils of the food, and least of all from the albuminoids. Much depends upon the character of the work to be performed. If great calls are made for a rapid or heavy output of energy, as in the case of race-horses, practical experience shows that it is not advisable to cut down the supply of albuminoids. In such cases the bulk of the food must be given in concentrated, easily digested form, in order that the nutriment contained in it may be quickly placed at the service of the animal, without undue wastage or strain on the processes of digestion.

It must be further borne in mind that the amount of work which an animal can perform is not determined by the food supply. It depends also upon the state of efficiency of the mechanism by which the work is performed (i.e., the muscles). An animal with feebly-developed muscles (i.e., in poor condition) will be unable to perform as much work as when its muscles are fully developed, even although it receive the same ration. The development of the muscles is induced by regular exercise, and requires for its support an increased supply of albuminoids in the food.

For these and other reasons it is advisable that the ration of animals that are called upon for heavy or rapid exertion shall be proportionately somewhat richer in albuminoids than the rations of animals at light or slow work or at rest.

— Milk-Yielding Animals. —

The case of the milk-yieldiag animal differs essentially from that of the fattening or growing animal, in that the special product manufactured by the animal is removed entirely from the body.

The milk of all classes of farm animals contains considerable proportions of albuminoids, fats, and carbohydrates. These materials are manufactured by the animal from ingredients of the body, which must obviously be replaced by feeding if the " condition " of the animal is to be maintained.

The production of milk-fat and milk-sugar can be sustained by supplying oil and carbohydrates in the food, but only albuminoids will serve for the production of the albuminoids of the milk.

It must further be borne in mind that the milk also contains appreciable quantities of various mineral ingredients, notably phosphates, potash aad lime, so that the ration must also make good the removal of these ingredients from the body.

From the foregoing considerations it follows that the milk-yielding animal requires, in addition to the ration which would " maintain " it were there no secretion of milk, a supply of food which must be the greater the more abundant the milk-flow, and which must indulge a liberal proportion of digestible albuminoids.

The ration of the milk-producing animal may thus be regarded as made up of two portions—a maintenance portion which will vary according to the milk-yield. Up to a certain point, which varies greatly in different individuals of the same class, any food placed at the disposal of the animal beyond the minimum necessary for maintenance is utilised very economically for the purposes of milk-production. When the food-supply is steadily increased, however, the point referred to is reached sooner or later, beyond which there is an increasing tendency for additional food to promote fattening rather than to increase the flow of milk. Eventually the limit is arrived at beyond which no higher yield of milk can be obtained by increasing the food supply. In these higher stages of milk-production the cost of production steadily increases and must be the determining factor in deciding what is the most profitable yield to aim at.

The percentage composition of the milk yielded by a particular animal is largely independent of the nature of the food supplied. Provided that the ration is such that it maintains the milk-yield and general " condition " of the animal, the composition of the milk can in general be but little affected by changes in the nature of the foods included in the ration. Even in the case of underfeeding, the composition of the milk is, as a rule, but little affected until the condition of the animal has been very seriously reduced.

Long-continued consumption of excessively watery food will probably lead ultimately to a general weakening of the organs of the body and thereby cause a secretion of more watery milk. As a rule, however, the amount of water supplied in the food can vary greatly without diluting the milk. Certainly under ordinary conditions the quality of milk secreted is quite independent of the amount of water consumed by the animal, the excess, if any, being mainly excreted in the urine and through the skin.

Although the nature of the food has, in general, little effect upon the percentage composition of the milk, it may have an appreciable effect upon the quality of the milk in other ways, e.g., flavour, hardness of butter-fat, and so forth. This fact must be kept in mind in selecting foodstuffs for the ration of cows.

Weeds.

" Weeds are feared by those farmers who have made some mistake in the management of their fields, by virtue of which the weeds have found a chance to prosper.

Weeds, therefore, may be said to have a mission—first, to educate the farmer, and second, to ameliorate the soil.

Good and judicious tillage and cropping are the only effective means of keeping down weeds. A foul place can be cleaned by inaugurating, for a time, a short and vigorous rotation of crops.

The Methods of Packing and Selling Eggs.

Eggs sent from foreign countries to England are packed in what are known as cases, or half cases. A case of eggs contains 12 long hundreds (1440), or 120 dozen. The purchaser is charged for 11½ long hundreds only, the other 60 eggs in each case being the buyer's allowance. This is to indemnify the purchaser for any broken ones. Whether there are any broken or not there are always 60 allowed, but if the breakages are over a hundred it means a claim, which must be made within three days of receiving them. The 12 long hundred cases measure 7ft. long, 2ft. wide, and 1ft. deep. In the centre are two upright boards the same size as the ends of the case, thus making a twin case. In each end are packed 720 eggs, the advantage of the centre boards being that the case can be cut into two half-cases intact.

The Danes, Italians, Roumanians and Irish use straw as packing, and Russia, Hungary, and Austria pack the eggs in fine wood shavings. The Italians have a system of putting the straw through a process of crushing that makes it more pliable. It is passed through rollers, flattened out, and then thoroughly dried.

English poultry farmers send their supplies to market in all sorts of packages, large and small. Of late years, however, boxes with fillers, such as are in use in this State, are being more extensively adopted.

In the English wholesale trade—that which applies to importation—all the eggs are bought by weight, and are termed 15, 16, or 17 pounders, as the case may be. The 15-pounder egg is one that weighs 2 ounces, the long hundred (120) weighing 15lb. A 2¼-ounce egg would weigh 17⅞lb. to the long hundred. The eggs are neither individually nor collectively weighed by the packers in the respective countries, those used to the business being able to grade them to weights sufficiently correct for the wholesale men, who in turn sell them to the grocers and other dealers, each weight having a separate quotation. In America the usual trade cases contains 30 dozen; they are sold at so many cents per dozen.

— Preserving Eggs. —

Of all the products of the land, none lend themselves to holding over for a season with such mathematical certainty of profit as do eggs. Cereals can be held for considerable periods without any serious deterioration, but there is no certainty that the markets will be any better at the end of six months than at the time of harvesting. The same applies to stock. To-day's market can be normal, but no one can tell whether at the end of six months prices will be higher or lower than at present.

Not so with eggs. For as long as we wish to go back in this or any other country, the late autumn prices per dozen will be from 250 to 300 per cent. higher than those of the early spring months; and this is one point wherein the poultrymen can and do score over other producers. When in spring the price for eggs is 8d. per dozen, the late autumn following they will be 1/10 to 2/- per dozen.

This feature in the egg business has been, for a century or more, responsible for thousands of attempts being made, and hundreds of patents being actually granted, for the preservation of eggs—that is, the keeping of them over in an unimpaired condition from the plentiful spring time till the late autumn or winter, when prices are higher.

Of the various systems, the later one of cold storage is certainly the best; but for those removed from cold-store rooms, or those near them with but small quantities, there are several formulae of proved efficacy.

In connection with the preservation of eggs, there are still some theories, and later day ones, which have to be contraverted. The principal one, and one which periodically appears, is that eggs must be infertile, or, as one writer lately put it, "Eggs, to be preserved, should not be fertile. If taken from the pens where a male bird has been running with the hens, their preservation will not be so successful."

Were eggs not gathered daily, or allowed to lie in a nest exposed to the sun for a day or two, the fertile ones certainly would not give the best results; neither would the infertiles. New-laid fertile eggs, when stored, came out in six or eight months' time in excellent condition while others, both fertile and infertile, came out of the rooms flat for the reason they were in that state when stored.

One other point in relation to the packing for preservation. According to some, the thick end of the egg should be uppermost; others consider that the thin end should be at the top. Experiments showed that, when the goods were of the same quality, it did not matter which end was up, and, at the present time, the bulk of those who store do not bother which end is uppermost.

In hatching, quite a number of breeders keep a certain end of the

egg up, from the time it is laid till placed under a hen or in an incubator. This is but a theory also. Time after time the writer has had equal results, no matter how the eggs were kept, and, if we were to follow nature, the eggs should be placed on their side, this being the position the hen leaves them in the nest when laid.

In England the same theories exist, and in order to prove or dispel them, Mr. W. B. Green, poultry lecturer to the Harts County Council, England, conducted a number of experiments, and published a report. He found that fresh fertile eggs kept for seven months in water-glass, lime water, cream of tartar and salt, and lime water only, were as good as infertiles kept under the same conditions, and it did not make any difference which end was up.

To those to whom it is available cold storage is the best egg preservative. The custom is to use 36 dozen cases, with white cardboard fillers. The questions of temperature, humidity, and cleanliness, are the chief points in successful egg storage. The temperature must not permit freezing, but water freezing point, 32 deg. F., will not freeze eggs. Extended experience shows that 28 deg. F. is the best. Eggs in the latter temperature will keep longer than at a higher figure. A regular temperature, with small limits, will give the best results.

Humidity is a subject that has not received much attention in relation to egg storing. American experiments, however, show that this depends on the construction of the rooms and the quantity stored. The brine-pipe system is considered too moist for the best results. At the same time, there have been very few complaints regarding this system. Eggs absorb odours, and to be safe in this respect other commodities should not be stored in the same room. It is said one of the handicaps to success in egg storing is probably due to the eggs being often stored in kerosene cases.

The length of time that eggs can be kept in cold store depends largely on their condition when they enter it. Eggs laid early in the season, when the weather is cool, assuredly keep best, and, if well graded, packed properly, and transported carefully, will be of excellent quality at the end of nine months.—By George Bradshaw, in Agricultural Gazette of N.S.W.

Killing Poultry.

All birds should be starved for twenty-four hours before killing in order that the crop and intestines may be emptied of food. A great amount of loss arises from neglect of this precaution. They should be killed by dislocating the neck just where it joins the head. Some people like them to be bled by a knife passed through the slit in the roof of the mouth. Dislocation of the neck properly performed results in the breaking of the jugular vein, and the blood drains completely from the body veins into the neck.

PLUCKING.

Birds should always be plucked while the body is still warm, as the feathers then come out more easily and there is less danger of tearing the skin. Unless plucking is done when the bird is warm, it should not be done until the bird is quite cold, that is, at least twenty-four hours after killing.

In plucking, the operator should hold the bird by the legs, with the head hanging downwards, or, in the case of turkeys and geese, suspend it by the legs to a cord hung from the roof. Feathers are drawn by a firm yet gentle pull towards the head, this action loosening them from the skin.

The plucking should begin at the tail and be continued in the following order: back, neck, wings, sides, legs, and breast. It is unwise to start with the breast, as the surface veins in that part of the body are the last to drain dry and the carcase will be discoloured if any of those veins are broken. The breast bone should not be broken.

If for sale fowls must be plucked clean except for the head and half the neck; turkeys must also be plucked clean, but leaving the feathers on the outer ends of the wings and the tail; in ducks and geese the wings and half the necks must be left unplucked. The legs and feet of all birds should be very clean.

Lice in Horses.

There are three forms of scabies (itch) to which horses are subject: the sarcoptic, the psoroptic, and the symbiotic. These three diseases are caused by "Ascarides," or minute parasites, commonly called itch insects; each of the diseases, however, is caused by insects distinct from one another, although they belong to the same order—the parasites rarely affect human beings, and are easily destroyed if they do.

As these insects are very small and very much alike, measuring about the fiftieth part of an inch, more or less, in diameter, it requires a strong magnifying power and some experience to diagnose them correctly; but fortunately this means of diagnosis is rarely necessary, because they, so to speak, diagnose themselves by the part of the body they attack. The sarcoptic form is the most troublesome and contagious, and attacks the body of the animal; the psoroptic rarely attacks any part other than the forelock, mane, and root of the tail; whilst the symbiotic, attacks the lower extremities, principally the heels and back of the fetlocks, rarely, except in very chronic cases, being found above the fetlock joint; the same animal, however, may be affected by all three species at the same time.

Symbiotic scabies is less actively contagious than the other two forms of scabies, and confines its attentions to the lower parts of the limbs; it is rarely seen in well-kept stables, amongst well-berd horses, the fineness of the hair and the constant grooming prevents the insect establishing itself; but in ill-kept, unclean stable, amongst coarser-bred horses, when once it breaks out it is very liable to go through the stud. It is conveyed from one animal to another by brushes, currycombs, sponges, &c., but rarely, if ever, by direct contact from horse to horse.

The disease may be suspected if the horse shows signs of itching, by his constantly stamping and rubbing one foot or leg against the other, or biting the heels. The irritation is more active at night. The symptoms come on very insidiously; at first there are no very noticeable appearances, but gradually the epidermis (outer skin) will begin to desquimate (scale) and the hair will fall out. As the disease advances, the skin becomes thickened and a foul-smelling, viscid discharge comes from it (in that discharge will be found the insects and their eggs), the heels will crack and become exceedingly sore from the granulations commonly called proud flesh) that occur, and the animal will be stiff and lame on coming out of the stable. If the disease be allowed to go on, the skin becomes hypertrophied (thickened), and the whole part becomes one enlarged mass of fœtid sores. The disease may affect a horse for years.

The Treatment of Common Wounds of Live Stock.

There are five kinds of wounds which may be classified as follows:—

1. Incised wounds caused by a knife or sharp instrument.

2. Punctured wounds caused by thorns, etc.

3. Lacerated wounds caused by barbed wire, etc.; wounds caused by horning in cattle are generally contused and lacerated.

4. Poisoned wounds caused by an infected instrument, also bee stings, snake-bite, etc.

5. Bullet or shot-gun wounds.

— Treatment. —

If the wound is bleeding profusely when seen, the first thing to do is to stop hæmorrhage. If large blood vessels are injured they should be ligatured if possible, using aseptic silk or gut for this purpose. Where the bleeding is from small vessels the application of perchloride of iron (Liquor Ferri perchloridi) on a plug of tow is usually effective. The actual cautery may be used in some cases, and another method is to pack the wound with aseptic cotton wool or tow, and bandage it tightly in position.

If the animal is weak from loss of blood it is advisable to administer a stimulant such as whisky, ½ pint in a pint of milk or sweet spirit of nitre and sal volatile, one ounce of each in a quart of water. (These doses are suitable for a horse or ox.)

As soon as the hæmorrhage has been stopped the next thing to do is to clip the hair off the adjacent parts and to thoroughly cleanse and disinfect the wound and surrounding parts. If a rifle bullet is lodged in a wound or under skin, it should be removed if possible, but where it is deeply situated it is often advisable to leave it alone as important structures may be injured in attempting to remove it. The same applies to small shot in a wound.

— Disinfectant. —

The following may be regarded as good disinfectant solutions for wounds:—

1. Carbolic acid, 1 part; boiled water, 20 parts.

2. Corrosive sublimate, 1 part; common salt, 8 parts; water, 1,000 parts.

3. Jeye's Fluid, 1 part; water, 50 parts.

4. Zinc chloride, 1 part; water, 40 parts.

If the wound is an incised one, i.e., clean cut, after cleaning and disinfecting it should be stitched with aceptic silk, cat-gut, horse-hair or silk, and either bandaged with a piece of lint and bandage, or if in an awkward place to bandage, dressed liberally with an ointment such as Jeye's Fluid, 1 part; lard or vaseline, 20 parts; or Stockholm tar, in order to keep the flies off.

Should the wound be a lacerated one, full of sand and grit which cannot be entirely removed, two courses of treatment are open, depending on the size, situation, and nature of it. If the wound is very extensive and the muscles are badly torn it is advisable to stitch the severed skin in accurate apposition as far as possible, leaving an aperture at the lower end of the wound to allow of drainage and the daily washing out of the wound with disinfectants. Should the direction of the wound be downwards and inwards a counter opening will have to be made to allow drainage from the depths of the wound. In this drainage channel a piece of rubber tubing or a strip of gauze should be inserted after each dressing to keep the orifice of the drainage channel open.

Tim: Sarer Smith (you know 'er—Bill's missus), she throwed herseff horf the end of the wharf last night. Tom: Poor Sarer? Tim: An a cop fished 'er out again. Tom: Poor Bill!

Poultry Notes

Poultry-keepers who can run their fowls on stubble land should take advantage of it. The only thing lacking in a field is shade. If the chickens are being run out out in colonies in movable wire frames they will require some artificial shade. Many ways of affording this will suggest themselves to those of our readers who are ingenious in such matters.

We will suggest one or two. Stretch a piece of sacking or coarse canvas over part of the wire, but not so as to prevent the air circulating freely. Stick some large branches of spruce and firs into the netting; but see that they are made fast and not top-heavy, so that should a sudden gust of wind arise they will not be blown over. Hurdles interlaced with straw and thatch and fixed apex fashion into the ground make very good shade for chickens in summer. Fowls can endure a great deal of heat; but during that of noontide the birds generally like to rest out of the sun. See that they may be enabled to do so.

Where there are many young chickens about and they have still to be with hens, let the coops in which the hens are confined be as far apart as possible, unless each brood is kept to its own run, which is hardly practicable where the numbers run into hundreds. The late-hatched chickens which are not with hens should not be allowed to run with the elder brethren. The latter can take care of themselves, and will probably bully the youngest birds. With chickens it is the youngest which require the most care. See that the young stock is never without water, and that it is fresh. Water heated by the sun is injurious; put the drinking vessels in the shade. Do not replenish the vessels, but emptyand fill them again, and occasionally give them a thorough cleaning. Put fresh water down with the night feeding.

It is an unwise plan to force young poultry with condiments and stimulants. Chickens which make rapid natural growth in the summer are those which can generally be relied on to give a good account of themselves in the regular show season. But there must be no undue forcing. Another thing is that bad and irregular feeding play havoc with young fowls. On occasions—rare occasions, be it noted—much small and slightly damaged grain which is unfit for grinding will do well for fowls and chickens. But to give them mildewed and heated stuff is the very worst economy. There is little if any nourishment in it, and in most cases it is not fit to buy.

There is nothing like sound grain and sound meal. Many people can test the stuff with the palate or even by smell; those who unfortunately cannot are often imposed on. Regular dealers in poultry foods know the folly of offering rubbish to their customers; the chance vendor appears to imagine that any poor stuff is good enough for fowls. It may be for some sorts, but not for those birds which are worth their keep. The best quality food-stuffs are not to be purchased for the proverbial "little or nothing." But it pays to feed chickens on good food; the return is in the rapid growth of the birds, the strength of their bones, their freedom from ailments, and the delicacy of their flesh.

It is as well to give the growing stock a varied diet. Where the run is practically unlimited, one kind of grain may answer for quite a season; the variety is obtained from the "etceteras" which the chickens find in their rambles. Wheat is a fairly well-balanced grain. Oats — short, heavy grain, and not the long, thin, husky stuff which sometimes is offered for sale as suitable for fowls—make a good staple diet. A little maize (cracked), will not come amiss occasionally with oats, and, if it can be obtained, dari will prove serviceable. A handful of hempseed and buckwheat as a treat when the nights are cool, but not as a regular item of the diet, may be given. It makes a welcome change to have the grain soaked and given in a swollen state; it is relished and cannot do any harm, as a change.

One can get a good variety with meal. Sound broad bran (an excellent bone former) can be added to twice its bulk of ground oats. At other times a small amount of biscuit meal (the kind specially prepared for dogs and poultry, and not the sweepings from biscuit bakeries) or some of the advertised foods can be scalded and mixed with fine sharps; they are not so dear as some people imagine—in fact, since a little goes a long way, they can be used quite as cheaply as the ordinary run of foodstuffs given to fowls. Rice properly boiled in meat and bone "gravy" or milk makes a good variety in hot weather. Kitchen scraps of bread, vegetables, and meat well compounded seem always to induce an appetite when other things fail. The meat should be cooked to "ribbons," as it mixes better with meal, and especially with such as biscuit meal, in that state. Vegetable scraps, too, should be finely minced ere they are dried down.

It is thought that bread—and particularly the ordinary white bread—is bad for chickens in that it causes soft bones. We have not found this to be so, and we always give the chickens bread when we can procure it. We find it a good basis for the chickens' diet, and, mixed with meat and vegetables, and often with milk and dripping, it proves beneficial. It may be a dear way of supplying wheat product, if full price has to be paid for the purchase of it. But the scraps are better thus employed than being thrown out to attract sparrows and other thieves of poultry food.

There is this to remember in connection with the feeding of growing stocks: they must make steady progress. If chickens become dainty without any apparent cause, a judicious day's starving will often induce an appetiee and cure satiety. If they turn from their breakfast or do not eat it with relish, give them a free range, and do not attempt to feed them again until the next morning; then start them on well-mixed soft food. Should they, however, be confined to a small earth run devoid of vegetation, give them an iron tonic and a full supply of fresh green food. Let them out for an hour's scratch round the garden; they may disturb things somewhat, but it will not be hard work to put them right with a rake. Moreover, in the backyard run one must guard against the generous neighbour who imagines that the poultry-keeper does not give the fowls and chickens sufficient to eat. Surreptitious somethings thrown into the runs from next door for "the 'poor chickens" are generally calculated to upset their appetites.—"Poultry."

Devonshire Cream and Soft-Cheese Making.

From Leaflet No. 179 Board of Agriculture and Fisheries.

— Accommodation. —

The room used for cheese making should be one in which the temperature can be controlled to some extent. A temperature of 62 deg. F. in summer, and 65 deg. F. in winter is desirable, as too much heat produces too rapid drainage of the curd, and too low a temperature results in a wrongly fermented cheese.

— The Milk. —

A pure rich milk produces the finest cheese. It is not possible to make first class cheese from stale or acid milk, as the curd drains too rapidly. In some varieties of cheese the curd is cut or sliced in large pieces, the object being to retain much of the moisture; the smaller the curd is cut the more rapidly the whey drains off.

— Rennet. —

This is a substance which contains a chemical ferment having the power of coagulating milk. When milk coagulates the casein is precipitated, and the fat becomes mechanically entangled in it, the whole forming the curd. Reliable Rennet solutions of a very concentrated nature can readily be purchased, and are usually employed, after dilution with cold water, in the manufacture of soft cheese. Rennet solutions should be kept in a dark, cool place, preferably in stone bottles, as the light weakens the action of the ferment. When of good quality rennet is clear, of a light straw colour and nearly odourless. Rennet in the form of powders and tabloids is often used. For hot climates and where rennet is only occasionally used, the tabloids are preferable to the liquid rennet, as they are always of uniform strength and do not deteriorate when kept.

— Appliances. —

Tubs.—Wooden tubs fitted with lids, though not essential, are a great convenience. Wood is a non-conductor of heat, and is therefore most useful in maintaining the milk at an even temperature during coagulation. A falling temperature causes the cream to rise, involving much loss of butter-fat in the process of cutting the curd. Oak is preferable on account of its hardness and close texture, and it is most readily cleansed after use. In very cold or very hot weather an earthen ware or tin vessel containing water, which is heated or cooled according to the temperature at which it is desired to maintain the milk during coagulation is useful. This temperature varies with the cheese made.

Pipette.—A measuring glass or pipette is necessary to ensure accuracy in measuring out the rennet. One marked in cubic centimeters (c.c.), subdivided into ten parts, is the simplest form of measuring instrument to use. The comparative measures are as follows :—

3·55 c.c. (or, roughly, 3·5 c.c.), equals 1 dram.

1 c.c., equals 17 minims.

60 minims or drops equals 1 dram.

8 drams equals 1 ounce.

Draining Table. — The draining table should have a slightly sloping surface, and be provided with grooved channels for the whey to run off. Hard wood or slate is a good material for the table top.

Scoops and Moulds. — A metal scoop or spoon for cutting the curd is also required, as well as moulds, which are usually made of tin, but sometimes of wood.

Cloths.—The cloths required for draining the cream should be of fine, medium, and coarse texture. They are made of bleached linen, of the finest quality.

Boards, Mats, Paper, and Thermometers.—Among the other articles which will be wanted are boards 14in. by 8in. by ½in. in thickness, which should be made of hard wood, of such a nature that it will not impart any flavour to the cheese; straw mats, which can either be purchased ready made or made at home by threading together coarse wheat or rye straw; grease-proof paper, cut to a suitable shape for the particular variety of cheese; a wall thermometer to record the temperature of the making room; and a floating thermometer, which has been accurately graduated, for use with the milk and curd.

— Varieties of Cream Cheese. —

Cream cheeses may be made of two qualities (1) those made from double or very thick rich cream (2) those made from thin cream, or cream to which a portion of milk is added.

Double Cream Cheese.—For the manufacture of this cheese thick cream is necessary. If the milk is separated, the separator should be regulated so that the milk yields 6 to 8 per cent. cream; or, in other words, 6 to 8 lb. of cream from every 100 lb. (roughly, 10 gallons) of milk passed through the separator. The cream as obtained from the separator should be cooled to 60 deg. F. in summer, and 65 deg. F. in winter, and then placed in a fine-textured linen cloth, previously rendered sweet and clean by thorough scalding with boiling water. Sweet shallow-pan cream may also be used, and is treated in a similar manner. The cloth is best laid in a basin, and the cream poured into it, after which the four corners of the cloth are taken and tied together, so that it resembles a bag containing the cream. It is better not to put more than 1 gallon of cream in the cloth, as drainage is not easy with more than this quantity, and the cheese is apt to become too sour. The bag of cream should be hung up in a cool dry place to drain. Three times a day the cloth ought to be opened out and the sides scraped to remove the stiffened cream in order to facilitate drainage. At the second scraping down the cream should be transferred into a fresh cloth. It is sufficient if the cloth is changed once only though if done more frequently rather better results are obtained. The cream will be sufficiently drained in about two days, but the process may be accelerated by opening out the cloth and scraping down frequently, and by placing a small weighted board on the cloth containing the cream. When the cheese becomes of a stiff pasty consistency it should be emptied out of the cloth, and a small quantity of fine salt mixed with it preparatory to moulding; this will bring out the flavour and assist the keeping properties of the cheese. It is customary in some cases to salt the cream, instead of the actual cheese. The cheeses are turned out in square, oblong, round, heart-shaped, and other forms, according to the type of mould used. The cheeses may be removed from the moulds at once and are then ready for sale. They remain in good condition for from one to two weeks. They may either be done up in grease-proof paper and placed in small cardboard boxes, or done up in butter

muslin and afterwards wrapped in grease-proof paper, in which case no case or box is necessary. The cheese sold retail at sixpence is usually of about four ounces weight, and a gallon of rich cream should make about sixteen cheeses.

Ordinary Cream Cheese.—This is prepared from thin cream taken from the separator at the rate of 12 per cent. or from thicker cream to which milk has been added. It should be cooled to 60 deg. or 65 deg. F., and 1 c.c. of rennet added to each ½ gallon of cream. It should be allowed to stand for about 12 hours to thicken, and then ladled into cloths and treated in a similar manner to double cream cheese. This variety of cream cheese contains a much greater proportion of curd, and is not nearly so rich as the double cream cheese.

Gervais. — This is a popular variety of French cheese, made from a mixture of whole milk and cream, in the proportion of two to one. The Gervais is a small cheese, measuring about 2¾in. high by 1¾in. in diameter, and may be consumed either fresh or when of some age. The moulds for this variety of cheese consist of 12 small moulds fixed on one base. To produce 12 cheeses two quarts of warm new milk and one quart of cream should be mixed together by constantly stirring for at least 10 minutes. The temperature of the mixture should then be regulated to 60-65 deg. F., and 1 c.c. of rennet (diluted with a little cold water) should be added. Provision should be made to keep the temperature uniform whilst the curd is being produced. This will take about 12 hours, when the curd may be ladled into a draining cloth of a suitable degree of coarseness and hung up to drain as in the case of cream cheese. It should be treated in a similar manner to cream cheese as regards scraping, etc., and when sufficiently firm should be salted preparatory to moulding. The moulds should be lined with strips of blotting paper, a special variety of which is made for this kind of cheese, and then set on a straw mat placed on a board. The moulds should be carefully filled with the curd by means of a bone knife. The curd should be left in the moulds for a short time until the cheeses have become of settled shape, when the moulds may be removed. The cheeses may be loosely packed in grease-proof paper and tied up with ribbon, or placed in cardboatd boxes for sending by post or rail. Although Gervais cheese is chiefly eaten fresh, it keeps well for several days after removal from the moulds, and some prefer it at this stage of ripeness. Gervais should realise from 3/- to 4/- per dozen.

Devonshire clotted or Scalded Cream.—Though originally confined to the counties of Cornwall and Devon, the manufacture of clotted cream is now carried out most successfully in practically all countries. In addition to its having gained a great reputation as a luxury, it is now largely recommendid by the medical profession as an excellent fatty food, and is displacing to some extent the use of cod liver oil amongst invalids. Devonshire cream is very rich, containing from 50 per cent. to over 60 per cent. of fat, and this fat is of a more digestible kind than any other, being present in the cream in a finely emulsified condition. In the preparation of clotted cream it is desirable to use rich milk, such as is produced from the Channel Island breeds of Shorthorn cows will produce very good cream indeed. In Devon and Cornwall clotted cream is largely made from the milk of Devon cattle, but this is not essential, and the evening's milk from cattle, which are admirably suited for the purpose. Crosses with Channel Island cattle are also commonly employed.

The cream is prepared as follows :—

1. Whole milk, warm from the cow, is carefully strained into setting pans. The pans most suitable for the purpose hold about six quarts of milk, measuring 15 in. across the top, 7 in. in depth, and 11 in. across the bottom; they are, in fact, similar to "shallow pans," only deeper.

2. The pans of milk are left undisturbed in a cool dairy for the cream to rise. In summer, twelve hours or less is the time allowed, but in winter twenty-four hours is usual.

3. The pans should now be carefully removed and scalded, great care being taken not to disturb the cream on the top of the milk. Scalding is carried out by placing the pans on a hot-water stove, and allowing steam to play upon them until in not less than half an hour's time they have attained a temperature of 175 deg. to 180 deg. F., when they are removed, and either allowed to cool naturally, or are cooled by placing them in a stream of cold running water. The scalding should not be done too quickly, otherwise the characteristic scald flavour is not produced. The heating may be carried out by placing the pans on a kitchen range or hob, but the hot-water method is preferable.

4. When cold the cream may be taken off in a thick clotted condition, and is ready for sale. In summer it is especially advisable to cool the pans as quicvly as possible after scalding, as this ensures extra keeping properties.

The cream is generally sold by the pound. One pound of cream may be obtained from 1½ gallons of Jersey milk, or less; whereas nearly 2 gallons of Shorthorn milk may be required to produce the same quantity of cream.

Kind Treatment of Cows.

An interesting experiment was recently performed at the Kansas Agricultural College to determine the relative results of kind and unkind treatment upon cows. Three cows were treated kindly, and were found to give an average of 36 lb. of milk, with 4.3 per cent. of butter fat. Later, these same cows were frightened by jumping at them, howling at them and striking them while they were eating. It was found at milking that they produced only 23 lb. of milk, containing 3.4 per cent. of butter fat. Three other cows tested gave 31 lb. of milk containing 4.2 per cent. of butter fat under kind treatment. They were driven into a field and the dogs were allowed to bark at them and chase them. As a result they averaged only 23 lb. of milk with 3.6 per cent, of butter fat. It should not be necessary to point the moral.

Breeding Poultry for Egg Production,

(Continued from Last Issue).

Following a discussion of the methods of housing and feeding adopted during the currency of the experiment and which were entirely normal, Dr. Pearl continues his summary of the earlier stages of the Maine experiment as follows :—

This brings us to a consideration of the third of the great divisions of poultry management, namely, the hatching and rearing of the chickens. Here there are two methods : (a) the natural, in which the eggs are incubated by a brooding hen and the chickens are reared by a hen ; and (b) the artificial, in which the eggs are incubated in incubators and the chickens are reared in brooders. Each of these methods is widely practiced and each has its staunch adherents. There is, however, a very wide spread feeling amongst poultrymen that artificial hatching and rearing has, in the long run, an injurious effect upon the stock. This injurious effect, they will grant, may not be apparent at once. But if artificial methods are persisted in for a long period of time those holding this view maintain that the result will be a steady and definite, if gradual, deterioration of the stock in respect to vitality or constitutional vigor and productiveness.

Now since a time previous to the beginning of the selection experiment at this station in 1898 no chicken has ever been hatched on the Experiment Station plant except in an incubator nor reared in any other way than in a brooder. That is to say, the flocks of hens on the Experiment Station plant in 1911 represents the end link in an unbroken chain of more than 13 years (which here mean " generations ") of continuous artificial incubation and artificial rearing. It is quite evident, I think, that if these processes do bring about deterioration of the stock in vitality and productive qualities such deterioration ought by this time to be beginning at least to make itself apparent.

The possibility that such a deterioration in vitality and productiveness due to continued artificial incubation and rearing was the real reason why during the period of mass selection from 1898 to 1907 there was no improvement in the average egg production of the flock but instead a slight decrease certainly demands careful consideration. This interpretation of the results has specially appealed to a number of poultrymen. Thus Dryden, in Artificial v. Natural Incubation, writes :—" In the nine years' breeding work at the Maine Station artificial methods were used in hatching and brooding the chicks, and while we are guessing at the failure to secure high egg yield in this experiment I venture to guess the failure was due to a gradual lowering of vitality in the stock by artificial incubation."

The question then to be considered, in light of all the available facts, is as to whether there was during the course of the experiment in selection any lowering of vitality due to this cause, and further whether this can be regarded as the explanation of the failure of an increase in average egg production to appear during the selection period.

From the nature of the experimental work which it was desired to do it was impossible practically to employ natural methods of hatching and rearing when the writer took charge of the work in 1907. Artificial incubation had to be continued. It would seem that there are two lines of approach to the question as to whether the failure of the selection experiment to result in increased yields was due to deterioration following artificial incubation. On the one hand may be considered the actual facts regarding other evidence of deterioration beside egg production. While egg production is one index of vitality and constitutional vigor it is by no means the only one. Mortality and morbidity are other indices ; so also is the hatching quality of eggs. Did the flock show evidence of a real constitutional degeneration, as indicated not alone by egg production, but by these other factors as well ?

In considering the whole question it should be recognized that there is a difference between real constitutional degeneration and merely a state of temporary low condition due to an unfavorable immediate environment. The one is permanent and the other is only transitory. The one is truly constitutional, the other superficial. This brings us to the consideration of the second line of evidence which it is possible to get on the problem under discussion. If the real cause of the persistently low egg production during the selection experiment was artificial hatching and rearing merely changing the method

of breeding without ›wn anging the method of incubatfon or rearing would certainly be expected to produce no effect. If a purely environmental matter such as artificial hatching and breeding is an efficient check to improvement by one method of breeding, it ought if unchanged to act with equal effectiveness against any other system of breeding. If it does not so act one is forced to the conclusion that it was not really an effective factor in determining the results of the first method.

Let us now turn to the data. In regard to the first line of evidence, namely facts presented by other indices of general vigor and vitality besides egg production, adult mortality may be first considered. Table A gives the number of adult females put in the laying house, the number of these which died and the percentage mortality for each of the years covered by the mass selection experiment. The "number of adult females" means the number of pullets put into the laying house each year at the average age of about 6 or 7 months.

TABLE A.

— Mortality Records of Adult Females During the Period 1898 to 1907. —

Laying year.	Total number of birds put in house.	Number which died during year.	Percentage Mortality.
1899-1900	81	8	9.9
1900-1901	100	14	14.0
1901-1902	55	3	5.5
1902-1903	160	13	8.1
1903-1904	300	44	14.7
1904-1905	550	33	6.0
1905-1906	700	64	9.1
1906-1907	700	44	6.3
1907-1908	850	69	8.1

From the table the following points are to be noted:

1. As would be expected the percentage mortality is seen to fluctuate in amount year to year. These variations are without doubt to be accounted for by differences in general environmental factors in different years, and to accidents.

2. The general trend, however, of the percentage mortality is plainly downward during the period covered by the experiment in mass selection. That is, during the period from 1899 to 1908, when the egg production was showing a slightly downward trend the adult mortality was also distinctly diminishing.

3. There is no evidence from the figures of adult mortality to indicate either that artificial incubation and rearing or any other environmental condition adversely affected the constitutional vigor of the strain during the course of the mass selection experiment, or (b) that in such action is to be found the explanation of the failure of that experiment to result in increased annual average egg production.

The percentage mortality figures are given here only for the period covered by the selection experiment in order that direct comparison may be made between the trend of the egg production during that period and the mortality curve. It may be said, however, that since the laying year 1907 1908 the mortality of adult birds has fluctuated about the same average as during the three years preceding. During the laying year 1910-11 the adult mortality has been quite exceptionally low.

(To be Continued).

Size of Eggs.

Some people think that hens of three or four years of age lay larger eggs than those of under that age. Pullets' eggs (the eggs laid before a hen's first broodiness), or the first batch of eggs laid, are certainly smaller than the succeeding ones, but those produced at the second laying are usually the standard size which will be produced during the hen's life.

If a pullet commences to lay very early, say at five months, as some do, the eggs during her first laying will not be so large as those produced by one of the same breed which did not commence till seven or eight months of age.

Giving First Aid.

— Expert Information of General Interest. —

In the practical work of first aid the nature of the case renders it out of the question to depend upon any specified material equipment. The practitioner must rely upon his own resourcefulness in adapting to his needs anything within immediate reach. In case of a broken limb, anything may be improvised as a splint—a folded newspaper, an umbrella, a broomstick, or anything that may be bound to the limb to hold it rigid. In the case of a wound, any material, providing it is quite clean, may be used as an emergency dressing; but both the splint and the dressing require something to bind them in their places, and it may also be necessary to improvise a sling for the comfort of the patient. For this purpose we have what is called the Esmarch triangular bandage. The remarkable features of this bandage are its extreme simplicity and its extraordinary adaptability to every possible application. It is universally used throughout the armies of the world as an emergency bandage and in all first-aid practice.

The triangular bandage is made by cutting a piece of muslin or other material thirty-six inches square diagonally from the lower to the upper corner. You then have two bandages. Upon the numberless combinations and adaptations of this bandage a small book might be written. In the limited space at my disposal I can give only a few of the methods of its application. A little practice and ingenuity will soon evolve its remarkable capacity as a bandage.

We will call the base of the triangle the "lower border," the apex "the point," and the points at either end of the lower border the "ends." The bandage is ordinarily used either "broad" or "narrow." The "broad" is made by spreading the bandage out, then bringing the point down to the lower border and then folding in two folds. The narrow is made by drawing the point down to the lower border and then folding into three. With the bandage in this form the ordinary methods of use will readily suggest themselves, either in binding on splints or bandaging a dressing. In securing the bandage with a reef knot, care must be taken that the knot does not come over the wound

To make a head bandage, fold a hem about two inches deep along the lower border; place the bandage on the head so that the hem lies on the forehead and the point hangs down at the back of the head; then carry the two ends round the head above the ears, cross them at the back, bring them forward and tie on the forehead, then draw the point downward, turn it up and pin it on top of the head.

In applying this bandage, care must be taken to put the hem close down to the eyebrows, not to carry the ends over the ears, and to tie the ends close down to the eyebrows. And do not tie it high up on the forehead.

For a shoulder bandage, place the centre of the bandage on the injured shoulder, with the point running up the side of the neck; carry the ends round the middle of the arm and tie them; take a second bandage, fold it into a broad bandage, place one end over the point of the first bandage, sling the arm by carrying the other end of the bandage over the sound shoulder, and tie at the side of the neck; bring the point of the first bandage under the part of the sling resting on the injured shoulder, draw it tight, turn it down and pin it.

To make a large arm sling, spread out a bandage, put one end over the sound shoulder, let the other hand down in front of the chest; carry the point behind the elbow of the injured arm, and bend the arm forward over the middle of the bandage, then carry the second end over the shoulder of the injured side and tie to the other end; bring the point forward and pin to the front of the bandage.

To make a small arm sling, fold the bandage into the broad bandage; then place one end over the shoulder on the sound side; cross the arm over the middle of the bandage hanging down the chest; then bring the other end over the injured shoulder and tie at the side of the neck.

How to Beautify a Bathroom.

In this, as in all other schemes of house decoration, the woman of limitde means must "cut her coat according to her cloth." It is, however, possible to have a cosy, artistic bathroom in return for trifling expenditure and a little trouble.

A little care and taste is necessary in order to transform the bathroom of the average middle-class type into a "thing of beauty." In the first place the decorator's aim should be to convey the idea of daintiness and freshness. A "tile" paper of neat design should be chosen for the walls; blue and white is a favourite mixture of colours. A fairly good paper should be chosen as it will then stand varnishing, and will not require renewing so often, while, at the same time, it can be freed from dust by the application of a damp cloth. If one cares to go to the expense of painting the walls instead of papering them, similar economy and saving of labour will result. A pretty tint of art blue or green will prove very effective.

The woodwork must be painted in a shade of color to harmonise or contrast with that of the walls. Ivory paint always looks well, and will not clash with anything. A good bath enamel should be used for the inside of the bath, and pale shrimp pink is a color which looks particularly well here; failing this, ivory is the safest tint to choose.

The floor may be covered with one of the new well-known cork carpets; a matting is likely to be preferred to linoleum. If the latter is a necessity, it must be covered with several rugs or mats. For the bather's use there

should be a brown cork bath mat, or else one of those mats made of a thick sort of material something like a blanket. On no account must anything be used which will prove cold to the feet.

The window curtains or blinds may be made short and of butter muslin or art muslin. Cream muslin looks very nice for this purpose. Inner curtains of stouter material will improve the appearance of the room and keep out any draught. Cream linen may be used for this purpose, and may be embroidered with flax thread in suitable design.

Few people realise the comfort conferred by the presence of a chair in the bathroom, and where space permits this article of furniture should be introduced. Wicker chairs of smal' size can be bought for a few shillings and are more comfortable than the ordinary bedroom chair of stiff and precise shape.

A looking-glass is also a sine qua non, and will prove a boon to those members of the household who shave, and also to visitors and chance guests who are sometimes required to use the room as a temporary dressing-room. There should also be a shelf on which should rest those articles which are so often scattered "promiscuous-like" about the bathroom making it untidy, and often hiding themselves in out of the way nooks and corners. Among these, soap-dish, nail brush, tooth brush stand, candlestick and matches, should be found. A water bottle and glass should always be in evidence; the bottle filled daily with fresh filtered water.

Pegs and hooks for the purpose of supporting a dressing-gown and other garments should not be obtrusively placed, nor in greater abundance than necessary. Small racks of neat pegs may be bought for a trifling sum, which will probably not exceed a shilling. Towels may be hung on these and a towel rail will not then be necessary, the space it would have occupied being filled by the chair. Net baskets may be bought for about sixpence, which will hold washing-gloves, sponge, and loofah. Toilet requisites and sundries should be kept in a small cupboard in the bathroom

If the fittings do not include a small cupboard, one of white wood may be bought very cheaply, and enamelled to match the woodwork of the room, or a small rough wooden box which has contained groceries may be planed till smooth, enamelled, provided with a draw-curtain of art-muslin, linen, cretonne, or serge, and used as a receptacle for articles which it is unnecessary and undesirable to leave about, and which are nevertheless requisite in the bathroom.

To Preserve Hair.

What has made the hair thin? And what makes it fall out? In occasional cases there is some slight scalp disease, due to the presence of some one of the bacilli family, whose mission on earth is to annoy mankind. Such troubles must be cared for by those physicians who make a speciality of skin diseases. But nine times out of nine-and-a-half the trouble comes from defective circulation and thin blood. The doctor has to treat the general condition of the system, but the patient can herself give the local treatment to the hair.

It is very simple, and lies within the power of all, yet very many fail to get good results because of lack of persistence. Friction and perseverance are the two words that embody the secret of keeping the hair from falling.

To amplify, and to follow the process from its first step, let me say that a shampoo is the primary requisite. The cleansing preparation for this purpose is best made of green soap—an article resembling soft soap and smelling like melon seeds. It is found at the chemists only, and has a hygienic value absent in most soaps. Some chemists keep it in a liquefied form slightly perfumed, especially prepared for the scalp.

If it cannot be thus obtained make a shampoo of the following ingredients: One ounce of green soap, one tablespoonful of powdered borax, the white of an egg, and a pint of very warm water. Dissolve the borax in the egg, beating slightly; put the soap into a bottle, add the hot water, and shake well; then add the egg and borax, and shake until all is well blended. This is the recipe of a famous physician, and is the least expensive shampoo that can be had. A little perfume may be considered an agreeable addition.

Once a month is as often as the hair should be washed. I am aware that doctors often prescribe more frequent shampooing, but observation and experience both show the mistake of much washing. After the shampoo treat the head to a thorough rubbing with some tonic to aid the process.

Bad cases must have the rubbing night and morning for a time, but once a day will be sufficient ordinarily, and some persons can get along with two or three times a week. These are the ones who are benefited by treatment at various hairdressers.

Pour on to the scalp a little of the tonic, after having divided the hair with a comb, and rub lightly with the fingers. When the entire scalp is moistened put the bottle down, and with all ten fingers manipulate the scalp, moving it on the skull in preference to giving it a sharp superficial friction. The object of this treatment is to increase a sluggish circulation. The blood alone nourishes the hair, and if its supply is scant the hair cannot live.

Home Notes.

Making Housework Easier.

It would be impossible to devise a plan or system that would suit all housekeepers, for their needs are so different. Let each one avail herself of all the labor-saving devices it is possible to obtain, for we can afford to waste anything better than health and strength. Have the kitchen floor oiled, which will save you the hard and disagreeable task of scrubbing. Oilcloth or linoleum for the dining-room is pretty and easy to keep clean. In addition to the sweeping which will be necessary several times a day, go over it once or twice a week with a damp cloth, wiping it clean and free from dust. When it needs washing, dissolve a little Gold Dust washing powder in a pail of soft, warm water, dip the mop rag which should be a piece of old flannel, in this, and mop the floor with it, wiping it dry as soon as possible. During the semi-annual house-cleaning it is a good plan to give it a coat of varnish.

Then there are young housekeepers who are inexperienced but anxious to learn the best methods of doing their work, and to profit by suggestions.

Squares or oblong pieces of plain white oilcloth put under the children's plates will help to keep the tablecloth clean. Wipe them with a damp cloth after each meal, and they will always be clean.

How to Prevent Wrinkles.

The latest system for smoothing out wrinkles on the face is a very simple form of massage which does not necessitate assistance of any kind. Commencing at the ears the skin is rubbed with the fingers, not merely the tips, towards the nose with a simple cream or vaseline, and the treatment is continued until the grease has quite disappeared.

Some people put a small quantity of bran in their baths, choosing it in preference to oatmeal, as the latter clogs the pores of the skin in time, and some indulge in starch baths, the starch being supposed to make the body very soft and smooth.

It has been pointed out by a woman who knows, that the want of a daily bath is more often the cause of a prematurely wrinkled skin than we think of, and for this reason it is said countrywomen who work early and late, and only indulge in a bath now and then, get old-looking and faded after they have turned thirty.

Politeness in the Home.

It is significant to observe how some men fail to know how to treat their wives and sisters when they meet them. It seems to be too much trouble to lift their hats or to give their nearest the courtesy they would freely render any woman outside of the domestic circle. This should not be, and the sooner a revolution is accomplished the better . The ablest and most persuasive treatise on the etiquette of the home will not be able by itself to work the change, although it would be helpful towards that end. What is needed is the right training of boys and girls. Courteous behaviour should be enforced by parents in the same way as other qualities are taught.

Difference of Opinion.

People ought to know that the very best thing they can do is to eat apples just before retiring for the night. persons uninitiated in the mysteries of the fruit are liable to throw up their hands in horror at the visions of dyspepsia which such a suggestion may summon up, but no harm can come, even to a delicate system, by the eating of ripe and juicy app. before going to bed. The apple, proceeds this authority, is excellent brain food because it has more phosphoric acid in easily digested shape than any other fruits. It excites the action of the liver, promotes sound and healthy sleep, and thoroughly disinfects the mouth. This is not all the apple prevents indigestion and throat diseases.—"The Family Doctor."

We submit, since hearing Prof. Sanders at the Bayfield banquet, that this business of eating apples before going to bed is an unwise practice. The results are sometimes astonishing.—Editor.—"Wisconsin Hortilulture."

Creen Tea. How do you Drink It?

"As the Moors do. They take it with all their meats, Put, say, six leaves of mint and six lumps of sugar in the pot with the tea, and brew all together. They sometimes use lemon-scented verbena leaves instead of mint. The taste is brisk and pungent. The Moors drink it so largely because their food is farinaceous, and the tea acts as a sort of corrective. They drink it in glasses and without milk. It is better without milk.

Home Hints.

There is very little fixed dirt that cannot be removed with salt and vinegar.

Articles scorched in the ironing should be laid in the hot sunshine. This will remove a scorch that is not very bad.

Coffee and tea are rendered much more fragrant if made hot (not burnt at all) before water is poured on them.

Silk dresses should never be brushed, but should be carefully rubbed with an old piece of velvet kept specially for the purpose.

When a hat is wet with rain it should be dried with a silk handkerchief, brushed with a soft brush, and when it is nearly dry, with a harder brush.

The best thing to clean decanters is a mixture of salt and vinegar. Put a dessert-spoonful of salt in the decanrte, moisten with vinegar, shake well, and rinse.

If there is any fear that a bed not usually slept in is damp, put a bright looking glass between the sheets and cover it up. In a few minutes examine it. If its surface is dimmed there is cause for uneasiness. If a bright looking glass is not at hand, a tumbler warmed and turned upside down will answer the same purpose.

When lamps are clogged with oil the burners should be boiled in a strong solution of soda and water, and allowed to get thoroughly dry before being used again.

When making porridge don't add the salt until the oatmeal is nearly cooked.

When frying fish, if a little salt be added to the fat, the flavor of the fish will be greatly improved.

When chopping suet sprinkle it with a little ground rice; it will then chop quite easily, and will not stick to the knife.

Olive oil should be used for frying much more than is usually done. It is not expensive in use, as if not allowed to burn it can be used again and again, though any that has once been used for fish must be kept only for that. Whether oil, dripping, or lard is used for frying, it must be remembered that it does not really boil till it ceases to bubble, and begins to give off a blue smoke. It is best to test the heat by first dropping into it a small piece of bread. If this turns brown at once the fat (or oil) is sufficiently hot for use. If not, you must wait till it is hotter. This is the only secret of successful frying.

To prevent irons sticking to starched garments, add a teaspoonful of turpentine to each pint of starch, either boiled or raw. The smell of the turpentine passes away when the garments are ironed.

In cleaning copper cooking vessels use a rag moistened with vinegar and dipped in silver sand. Always wash the hands well after cleaning copper vessels or any kind of brass, as verdigris may give rise to poisoned wounds if a scratch or sore exists on the hands.

To prevent boiled custards from settling, use a double vessel, having the custard in the inner one, and boiling water in the outer. If no porridge or milk saucepan be at hand use a large jug in a saucepan of boiling water. If the custard is wanted made quickly, use an iron saucepan, and replace one of the eggs by a teaspoonful of cornflour. Lift the saucepan from the fire as soon as the first bubble appears, and continue the stirring until the custard is smooth and thick.

To clean brown leather cases and bags make a solution of oxalic acid by pouring over a pennyworth of it a pint of boiling water. When cool use a clean sponge and wash the leather article with the solution. Rinse it thoroughly with clean cold water, but do not soak the leather. Dry the leather article on a clean cloth and place it in the open air. It will then look like new, and if brushed over afterwards with a little milk it will keep clean for a long time.

To remove the smell of fish from forks, wash them in hot soda water and dry them, and stick them in a pot of fairly moist garden mould for about five minutes.

To remove the smell of fish from a frying pan, wash the pan with hot soad water, scrubbing it with a saucepan brush. Dry the pan with a dish cloth and place it over the fire until it is thoroughly hot, but not red-hot.

To imitate ground glass, tie a lump of glazier's putty in a piece of muslin, and gently dab the window pane with it until it is evenly covered. When dry it will last a long time without washing off, and when it has worn away it can be renewed. Should it be desirable to clear the glass again, soak the surface with linseed oil, and after an hour or two, wipe off the soaked putty with tissue paper, and wash the window with strong soda water. Another method of rendering a window opaque is to fasten to it tissue paper which has been brushed over with the white of egg. The chief advantage of this plan is that fanciful designs can be cut out of the paper before it is stuck to the glass, but when once it has dried on it is very difficult to remove.

A good floor polish is made by cutting two ounces of beeswax and half an ounce of white wax into a pint of turpentine, and let stand for twenty-four hours. Then dissolve half an ounce of white Castile soap in half a cup of boiling water. When it is dissolved pour into the turpentine mixture, mix thoroughly, and apply to the floor with a flannel cloth, rubbing vigorously.

The washing of calico or holland blinds is a very simple matter, but carelessness in the matter of drying them causes them to roll up crookedly. If they are hung on a line let the two ends, and not the two edges, hang downwards, and see that the edges lie closely together so that the blind may dry straight. Better still, dry the blind on a grass plot, placing a clean stone at each corner to keep it straight and in position. When half dry, fold the blind from end to end, and fold it in the same direction again until it can pass through the mangle. After mangling the blind, iron it so as to remove all the creases which, it will be noticed, all run across the blind.

TRIED RECIPES.

— Chicken and Tomato Sauce. —

Cut the white meat from the breast of a cold chicken in flakes, put them into a salad bowl, and arrange the lettuce leaves in a wall around it; place slices of tomatoes, which have been marinated in oil and vinegar, slice upon slice over the fowl.

— Ragout of Duck. —

One large duck, pepper, salt, 1 pint gravy, 2 onions sliced, 4 sage leaves, flour, ¼ oz. butter. Roast the duck before a clear fire for 20 minutes till it is of a nice brown colour; put it in a stewpan with the gravy, slice the onions, fry them, and add them with the sage finely minced; simmer for 20 minutes, or till the duck is tender; strain, skim, and thicken the gravy with flour and butter, give one boil up, pour over the duck, and serve.

— Pancakes. —

Pancakes are always liked. Make a batter with eggs, flour, and milk, adding a wineglass of ale, stout, or brandy, cook them to a golden brown color. When two are cooked, spread one of them with jam, put another on the top, cut into four corner pieces, dip each one carefully into omelette batter, then fry again for a minute in plenty of heated lard, take up and drain. Screen lightly with castor sugar, send to table as they are cooked. The pan for omelettes should be small and with a thick bottom, this regulates the heat so that omelettes, fritters, and pancakes may be sufficiently done without burning.

— Bengal Curry. —

Take four ounces of butter and one chopped onion, and simmer them together till well browned, then squeeze the onions and take them out. Put in the meat with a teaspoonful of salt, and simmer till the rawness disappears; then take out the meat and put in two tablespoonfuls of curry powder made into a paste with cocoanut cream and seasoned according to taste with cayenne pepper, a little dried chillies, dry ginger, and mustard; simmer this, stirring it constantly. Add half a pint of milk curds, and simmer again. Then put in the meat again, and add half a pint of stock and the milk of one cocoanut; simmer again, and put in the onions, chopped up very small.

Stew for twenty minutes or half an hour, add a teacup of cocoanut cream, and dish up.

(Continued on page 528).

Liver Disease of Poultry.

Liver disease, which is the name usually given to tuberculosis in birds, is one of the most common diseases of fowls, turkeys, pigeons, and other birds brought into relation with domestication. Birds which are almost exclusively affected by this disease are those which live on grain and fruit. I have only twice observed it in flesh-eaters. Those which live on fish are exempt from it."

— External Symptoms. —

In very many places the disease claims a victim with pertinacious regularity, but during the winter the death-rate often becomes alarming. The affected fowls become thin and emaciated, losing greatly in strength and weight, and they are frequently also more or less crippled. The appetite is impaired, they are usually off their food or feed in an erratic manner, and diarrhoea is usually persistent. The comb and wattles are pale and dry, and the mucous membranes are pale, wherever visible. The birds leave off laying soon as a rule. As a result of the extreme emaciation, which is usually the most important and general characteristic, the bones become very prominent, and the effect may be best judged by passing the hand over the keel of the breast bone.

— Anatomical Symptoms. —

On opening the bird the owner will find that the external appearances of thinness of the muscles are borne out by taking off the skin. The muscles are pale in colour, thus adding further testimony to the symptoms already noted of anaemia, but the most important and characteristic appearances are seen in the body cavity. The liver is brown in colour, sticky to the touch, and dotted all over with small white spots, or larger spots or patches of a white grey or yellow colour. Lifting up the gizzard, the spleen is almost certain to be found to be affected. It is usually enlarged and beset with small or large tubercles, which frequently project as fat-like tumours from its surface. The intestine and the lymphatic glands of the mesenteries are also often the seats of similar deposits. Tubercles sometimes occur in the skin and the joints, and the local swellings may then be seen externally, and affect the movements of the bird. The other organs of the body, as a rule, are not affected. As a result of the weakness produced by the disease the poultry are more liable to parasitic invasion.

— Cause. —

The exciting cause of the disease is a bacillus which may be considered a variety of the bacillus of mammalian tuberculosis. It gains entrance, in practically every case, with the food, or by means of faeces of affected birds. The tendency to the disease is inherited.

— Prevention. —

The present prevalence of the disease in this and other countries is due to the widespread ignorance as to its nature. The birds which die of the disease are usually thrown on the dung-heap at a farm, and as the fowls have commonly the run of the place they may often be infected by this means. But the most frequent source of infection is the poultry-house or yard which receives the droppings from affected birds containing the bacilli, and the conditions as regards cleanliness, damp, and absence of sunlight are frequently such as to greatly favour the spread of the disease.

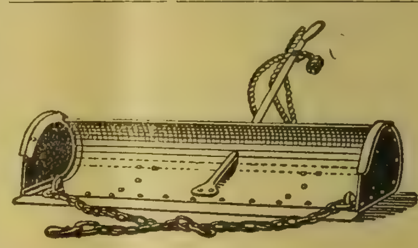
The stock at any place affected with liver disease may be divided into the resistant and the non-resistant. The breeding tends to be done more from the former than the latter, and this natural process of making the stock stronger would be greatly assisted by the owner burning or deeply burying in lime the birds which have died, and improving the condition of the survivors.

To exterminate the disease, however, something more than that is required. A house should be built with a run in a corner of a field apart altogether from the old poultry-yard, or the system of movable houses, with frequent change of position, may be adopted. Then the strong and healthy birds should be carefully selected and put in the new house; and, if any of them show the least indication of disease, they should be at once removed and the house disinfected with chloride of lime (¼ lb. to 1 gallon water), or quicklime, or any other good disinfectant. The resistant birds will in this way be separated from the weaker, and will form a foundation for not only a disease-free but a disease-resisting stock.

The hens which have been left should be killed, with the exception, perhaps, of those about which a favourable doubt may exist, and which may be kept in quarantine and carefully fed in a separate disinfected place. The old house should receive several applications of a thorough disinfectant, and the tainted poultry-run should be heavily dressed with gas-lime. Many months should elapse before the birds are again brought back to their old quarters. Periodical disinfection, cleanliness with regard to house, food and water, good ventilation, and the access of sunlight will largely promote the health and vigour of the stock.

— Cure. —

It is probable, as is the case with mammalian tuberculosis, that a cure will often result from improved conditions and removal from fresh sources of infection, and should a cure be attempted that is the only direction it should take.—Leaflet 78, The British Board of Agriculture.



Pigeon Notes.

Victorian Notes.

(By G.J.M.)

As foreshadowed in a previous issue ie formation is announced of "The [M]elbourne Pigeon Improvement So-[c]iety." The objects of this association [a]re given as follows:—

To encourage the importation, breed-[in]g, and exhibition of various kinds [o]f pigeons, and any other such birds [a]s the Society may approve of.

An open show with liberal prize [m]oney is to be held, also a monthly [s]how for the members. It is intend-[e]d to have rings made here, and there [i]s to be a lecturette at each club meet-[in]g with the object of giving practical [in]struction to enthusiasts in the vari-[o]us breeds, and of uplifting the fancy [i]n general.

The principal office bearers are:— [P]resident, Mr. R. Mathieson; Vice-[P]residents, Mr. C. Meaker and Mr. [G]eo. Heath; Secretary, Mr. Gus Shee; [a]nd Treasurer, Mr. F. Crotty. A [s]trong committee has also been elect-[e]d to assist, and it is confidently [h]oped that the thing will go with a [s]wing from the start.

Mr. George Woodward, until re-[c]ently associated for years with Mr. [G]. J. Mead in the breeding of Mag-[p]ies and Jacobins, sails for England [o]n Tuesday, 18th inst., where he in-[t]ends to make a lengthy stay—proba-[b]ly of years. Fanciers who would [l]ike him to send them out birds at [a]ny time may communicate with him [a]t any time through his erstwhile [p]artner, Mr. Mead, of Nelson Street. [B]alaclava, Victoria.

Things are quiet over here just [n]ow, there being the proverbial calm [b]efore the storm, as all fanciers are [g]etting ready for the winter shows.

With two societies in the field [t]here is a chance for the exhibitor, [p]articularly if the motto is co-opera-[t]ion, and they pull together.

I am assured by both sides that they do not hope to destroy but that the interests of the fancy will alone be considered.

I hear that Mr. Crotty has again been importing—this time Jacobins and Pigmy Pouters. This last-named breed for some reason hangs fire in Victoria, but this sterling fancier at least is doing his best to put it on its feet. May he succeed is all I have to say.

Cleanliness.

Cleanliness in the pigeon-loft is always the first thing to think about and practise, for, mark you, without it no man will ever be thoroughly successful, no matter what variety he may keep.

It is admitted that now and then we do see a good bird emanate from a loft which is just the reverse of being clean, but it is a poor credit to any owner who may be so lazy as to let things get in such a state, and for certain no bird, be it ever so good. can long be kept in tip-top form or condition in a dirty loft.

Many a fancier says: "Oh, I have not time to often clean out the birds; it takes all my time to see they get clean water and are fed." Whenever I hear this said, and that is very often, it makes me think of a big Dragoon fancier friend of mine.

Talk about cleanliness—it is grand. The very air in the place always strikes you as if it had been cleaned. Goodness knows, my own are kept clean enough, yet I always feel there is something lacking when I compare them with my friend's, and there is: it is tidiness which I lack. Just fancy nine aviaries, and yet every one regularly cleaned every morning; clean water, sand in the flight sifted over, pen-room swept up; in short, everything in apple-pie order.

I have known men who were non-fanciers, and never dreamt of being pigeon fanciers, who, having out of curiosity gone into the garden to see what manner of pigeons Dragoons might be (probably half expecting to see something like a cross between an ostrich and a soldier), have been so attracted by the neatness and cleanness of the aviaries—and the birds—as to straightway become pigeon fanciers, aye, and some are the best of fanciers to-day.

It is not as if it required a lot of manual labour to keep several aviaries always clean. Many reading the foregoing will believe my friend finds it necessary to keep a pigeon-man, but nothing of the sort, the whole of the work being personally done each morning with the aid of a boy who comes in before going to school. It is this doing it without fail each morning which makes it so easy, for it takes less time done thus than if left for a week and a special day put in at the job. At this time of the year most fanciers can rise half an hour earlier, and so clean out the houses as well as giving clean water. Keeping the place clean has more to do with winning prizes than some people imagine.

Don't forget the whitewash. Give the walls a good brushing down with a stiff brush before applying the limewash; scrubbing the dirt, etc., off being quite as important as the remaining operation. While at it, limewash the floor; not only will it hide the splashes you have made, but it must help to sweeten the places. Twenty years ago I remember going to visit one of the shining lights of the Fancy (the type of fancier now renamed pot-hunters), who had just finished lime washing six houses. On my saying how I disliked limewash (in those days I was considered a dandy, and could not tolerate such stuff for fear it got on my clothes), he treated me to a regular fatherly homily on how necessary it was for all pigeon houses to be limewashed at least once a year to sweeten them. "Then why not limewash the floor?" says I. "What for?" says the old stager; "the idea is ridiculous. Whoevere heard of floors being limewashed!" "To sweeten the place," says I; and so I left him doing the same as our old parrot does when it gets a new idea into its head—scratching his poll. Anyway, ever since those floors have had an annual coat, as well as the roof.

Another coat I believe in putting a white coat on is the roof — not to sweeeten, but to cool the place during the heat of the day. You, my friend, take care to change your black hat for a straw one with a view to coolness, when all the time it would answer the purpose if you whitewashed the black one; so just slap-dab the outside of the roof—it all helps to cool the inside, and will not harm the felt or iron roofing.

Keep the drinking water in the coolest part of the flight, and be not sparing with the bath. With a view to reducing the insects which are now to be found on the birds themselves, get some Keating's powder, and sprinkle under the wings, around the neck and above the tail.

(Continued from page 525.)

— Omelette in Batter. —

Make an omelette and fry carefully in batter; when done drain, cut into square pieces, and dip them into beaten egg; thicken with flour, and fry to a light brown color in heated sweet lard. Dish and serve with any kind of jam

— Egg Nest. —

Egg Nest is very light and dainty, and makes a pleasant change from ordinary modes of serving. Beat the white of a new-laid egg to a stiff froth, and heap it on a piece of toast Make a little indentation in the top, and slip the yolk into that, put in the oven until the egg is set. Season with salt and pepper and put a tiny bit of butter on top before serving. For poached egg nest butter the inside of a cup and pour in the stiffly-beaten white of a fresh egg. Make a little nest in the centre and carefully drop in the yolk. Squeeze a drop or two of lemon juice on top, and set the cup and turn out. In cooking, the froth will rise to the top of the cup. As soon as the white is set, invert plate over the top of the cup and turn out. Sprinkle with a very little minced parsley and serve quickly. These ways of serving will often tempt an invalid or delicate child to eat a fresh egg, when it would be otherwise rejected.

— Pressed Chicken. —

It is rarely that an Australian housewife thinks of using the feet of chickens in any way; yet the thrifty French woman would feel very extravagant if she did not utilise them. They are first scalded to remove the skin, and then simmered slowly with other materials for soup stock. The stock from the feet forms a firm jelly when cold, so it is useful when making pressed chicken. Another waste portion of the fowl, according to our own ideas, which the French cook utilises, is the comb, which is used as a garnish, and served in a variety of ways.

— Fowl Giblets in Curry Jelly. —

Scald and clean the giblets of two fowls, and put them into a stewpan with 1 sliced onion and some chopped celery, pepper and salt to taste; add about a quart of water, bring it to the boil, then gently simmer for an hour. Take out the giblets and boil the broth until it is reduced one-half; soak some gelatine in water enough to cover it; strain the broth, add the gelatine, and stir till quite dissolved, then add a dessertspoonful of curry powder, boil 10 minutes, then set aside to cool. Slice the giblets, arrange a layer at the bottom of a plain mould, pour over some of the half cold jelly and let it set; then place another layer of the giblets and some more pelly, and so on till the mould is filled; stand the mould in a cold place for 24 hours, then turn the jelly mould on to a dish. A few sliced mushrooms added to the giblets are a great improvement.

— Veal Rolls. —

Some thin slices of veal, egg, breadcrumbs, forcemeat, a few slices of fat bacon. Cut some slices ½ inch thick from a fillet of veal, rub them over with egg, then spread over some forcemeat; roll up each piece tightly, egg and breadcrumb them, and fry a rich brown. Serve with rich gravy or mushroom sauce.

— A Breast of Veal Forced and Larded. —

First make a forcemeat for the veal. Then run a sharp knife between the meat and the bones, stuff the forcemeat into the crevice, and sew up the end with worsted to keep it safe. Blanch it by dipping the meat two or three times into boiling water. Then dry it and lard with fat bacon, lightly dust it with fine flour and spice mixed and lay the meat in the jar.

Put thin slices of bacon over it, another minced shallot, a cluster of mixed sweet herbs, a rasher of ham; again season with pepper, salt, and fine spice. Put on the lid of the jar and set in a good oven. When thoroughly heated, pour in a gill of any sort of rich, sweet stock, cover the whole with two well-washed heads of lettuce.

When the meat is ready, place it on a hot dish while you mince the lettuce, ham, and bacon, strain the liquor into a clean saucepan, and thicken it with a dessert-spoonful of flour mixed with a little cold stock. When it boils, add the minced lettuce, ham, and bacon. Pour the whole around the meat. Garnish well with pieces of lemon and tufts of parsley set here and there. It will take three hours to cook.

— Cottage Pudding. —

Three-fourths cup of sugar, one tablespoon of butter, one-half cup of sweet milk, white of one egg, one teaspoon baking powder, flour to make stiff. Bake in a loaf. Sauce—One-half cup sugar, yolk of one egg, one teaspoon flour, mixed in sugar, one tablespoon of vinegar, butter size of an egg, one teaspoon of vanilla.

— Crystallised Pumpkin.

Peel the skin, cut the pumpkin into strips about one inch thick. Throw away the seeds. Soak for two hours in lime water, two spoonfuls of lime in sufficient water to cover the pieces. Before cooking the pumpkin wash off the lime, first with cold water, then with boiling water. Boil sugar equal to weight of pumpkin, using enough water to dissolve the sugar. Then when boiling add the pieces of pumpkin and boil for a quarter of an hour Turn out into a basin and leave the whole to soak for a day and a night After this place the pieces to crystallise in the hot sun.

— To Preserve Figs in Syrup. —

The following will be faund a very satisfactory method :—To 2 qarts of water add 6 lbs. of brewers' crystal sugar, boil for half an hour ; then add 12 lbs. of whole ripe figs and boil gently for two hours ; afterwards add ½ lb. almond kernels, bottle, and seal, and they will keep for months and retain a delicious flavor.

— Pumpkin Marmalade. —

Four lb. of tender, young yellow pumpkin, 4½ lbs. of sugar, half a dozen lemans, and half a dozen oranges ; cut the pumpkin into small cubes ; mix the sugar with it, and let it stand over night. Peel the oranges and lemons, and boil the rinds two hours, changing the water twice. Trim off as much of the white part as possible from the oranges and lemons to prevent bitterness, and when the rinds are cold slice them and the insides of the oranges and lemons with a sharp knife. Put the whole into a stew-pan and boil for two hours, or until the marmalade will set. Fill into jars, cover, and tie down.

— Braised Breast of Lamb. —

Take a breast of lamb, remove the skin, and put the meat into boiling water for a few minutes. Take it out and drain away the water. Let the meat cool, then put into a pan without about half a pint of stock, some slices of bacon. Add pepper and salt, two chopped onions, and a few carrots. Parsley, thyme, mint, or any savory herbs you like may be added to give a flavor. Simmer all very gently until thoroughly tender. Boiled macaroni may be served with this dish.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—65, Currie St., Adelaide. Telephone, 1234.

Open Border Notes.

— Hardy Annuals. —

Sow and transplant all hardy annuals. Soil for seedbeds should be loose, friable, and not rich, and seed should be sown thinly and pressed firmly. Most annuals can be transplanted without difficulty or danger of loss. Some should be sown where they are to flower. Sweet peas, nasturtium, alyssum, mignonette, linum, nemophila are amongst the more common varieties, which resent movement. Poppies and stocks are of the class which can be transplanted, but which probably make better growth and produce finer flowers if sown directly where they are to flower. When transplanting it should be remembered that a well pulverised soil which is slightly moist is very helpful and greatly reduces the risk of failure. Prepare the bed a day or two before planting. Plant firmly, and water immediately.

— Perennials. —

Sow, transplant, and make divisions of established clumps of such as grow from a crown. Primroses, perennial phlox, daisy, polyanthus, violet, etc., may be so treated. Perennial sunflowers and summer and autumn flowering perennials can be taken up and heeled in in some suitable position, or divided and set in nursery beds. In any case, some fresh soil and old manure should be dug in preparatory to replanting.

— Bulbs. —

Final plantings of spring flowering bulbs should be made this month. Keep beds already planted free from weeds, and a gentle stirring of the surface soil will not only keep the bed more tidy but will help the growth of the bulbs. Unless specially fine blooms are wanted a carpet of a dwarf growing annual is desirable, for it will make little difference to the size and quality of the flowers. Seeds of bulbous plants, such as Ranunculus, Anemone, Spraxis, Ixia, Freesia, and Gladiolus, may be sown.

— Roses. —

Make up lists of new plantings. Prepare beds or stations for same. The rose likes a soil which is heavy rather than light, but will thrive and give good returns in anything from stiff clay to almost pure sand. Where the nature of the ground permits it holes at least two feet square should be taken out. In re-filling do what is possible to improve the soil; if this is not reasonably suitable sand, quicklime, or rough garden compost will help to lighten a too tenacious clay, whilst any heavier earth, slaked lime, marl, cow or pig manure, and well-decayed vegetable matter will improve that which is too sandy. Nine-tenths of the soil around Adelaide will grow all but the very highest quality blooms without any other preparation than thorough working, and the addition of some coarse bonedust. In cases where mildew makes its appearance, a dusting of air-slaked lime and sulphur is an old and good remedy.

— Cuttings. —

Not many people take advantage of the fact that a very great number of trees, shrubs, climbers, and flowering plants generally may be easily grown from cuttings. Probably it is because individual requirements are small, and time and trouble are saved at the expense of a few shillings spent at the nurseryman's. Most roses of the stronger growing varieties, for instance, strike easily. Own-root roses, as they are called, make excellent hedges, and for the ordinary gardener produce as many and as fine flowers as budded stock. Others of the more common varieties of showy plants which do well from cuttings are Tecoma, Plumbago, Solanum, Bougainvillea, Oleander, Veronica, Hibiscus, Fuchsia, Begonia, Hydrangea, and Spirea. To get best results, prepare a bed about four feet wide by as long, as may be required, by taking out the soil one spit deep, breaking up the lower spit thoroughly, and mixing with it a fair proportion of sand and returning the top spit, at the same time adding more sand. If sand is difficult to procure, keep what little you have for placing in the trenches at the base of the cuttings. To prepare the cuttings, take well ripened but not old wood, cut into lengths of about nine inches. Let the cuts be made with a sharp knife, and be just above the top bud, and just below a bottom bud. Draw out trenches, having one perpendicular side; scatter some sand at the bottom, lay in the cuttings against the perpendicular side so that one bud only is above the ground; fill in more sand around the base, then return some of the earth and firm it around the bottom; the fist is a good thing to do it with. The foot is even better, but be sure to get it firm. Cuttings should be three inches apart in the rows, and the rows be not less than six inches, preferably a foot apart. Carnations, Snapdragons, and many semi-woody and succulent flowering plants will root readily if so treated at this time of the year. In this case younger, unflowered side growths about three inches long should be used.

— Planting. —

May is probably the best month of the year for planting out ornamental and flowering evergreen trees, shrubs, climbers, and palms. Soil preparation is of special importance with such permanent subjects. The soil is now warm and the atmosphere will probably continue moist and genial for some weeks to come, thus immediate root action will be encouraged and the plants take firm hold of their new quarters. With pot-grown stuff, the ball should be thoroughly moistened, before being turned out, and in planting, the roots should be carefully spread out and finely sieved soil used for firming around them. After planting a good soaking should be given, but on no account knead wet soil around the roots; especially is this to be avoided in soil which is at all sticky. A stake, temporary if not permanent, is important, otherwise the fine roots are wrenched away every time it blows.

— Carnations. —

This is an important month for the carnation grower, for he may sow, layer, strike cuttings of, or plant out what he has already bought or grown. The carnation does not appear to be very particular as to soil, for excellent blooms are obtained on a wide range. Light, rich and well-drained, or as near as you can get to that description is good enough. The Carnation is a beautiful flower, but the plant itself is not particularly decora-

(Continued on page 532).

The Art of Planting.

My brother amateurs will probably have had as many failures as I had until I began to think, observe, and inquire about the right way of planting things—hence these hints. Trees and shrubs receive their food through the small fibrous roots, which must be kept in close contact with the earth. I used to cut these away in the days of my ignorance.

Long tap roots reduce the supply of fruit and flowers, while increasing useless wood and rapidly exhaust the soil. By all means cut these away.

Where it is possible, soak the ground around the trees you intend to remove for a couple of days in advance, and take them up with as much soil about the roots as is possible. I used to wash the soil away. I am wiser now. Prepare the place where you are going to plant your trees by digging out the old earth, if unfit—in any case by loosening it—and mixing in wood ashes, rotted manure, decayed leaves and the like.

If you get your trees from a distance you will have them cleared from soil and packed with wet straw and the like. It is a good plan to soak the roots in a thick mixture of earth and water, as that supplies much-needed nourishment at once. Cut away with a sharp knife all bruised fibrous and tap roots.

I used to plant all trees as deeply as I could. For many kinds this is fatal. Fruit trees must not be planted deeper than they were in the nursery. The roots should be spread loosely in shallow holes and a mound of earth spread over them to obtain the best results. In any case deep planting is wrong.

One most important point to be remembered is to shake plenty of fine earth in amongst the roots after you have spread them out flat and loosely. Then shake the tree to cause the earth to settle close round the roots. Then trample the earth well round the roots, and do it thoroughly, so that the roots may be able to get a grip on food supply. In this way the trees get a good start.

Another very important point is to have substantial stakes driven firmly into the ground before you begin planting, so that your trees may be fastened to them in some way that will not bruise them. If not staked, the wind causes the trees to shake so much, even on a calm day, that the fibrous roots are damaged by being torn away.

—E.J.P.

Arranging Fruit and Flowers.

Nothing is more frequent in our homes, and more especially in our gardens, than to see good things either misused or merely got together without any attempt to classify or to harmonise.

In nine gardens out of ten, whose owners have partly awakened to a love of flowers, the first thing is the collecting together of a large number of different kinds of plants and shrubs Here it is quite natural and excusable. because every beautiful flower that is seen elsewhere is admired and desired. Therefore, it is quite a reasonable way to begin; but it should only be a beginning. It is a means of gaining a good knowledge of the plants. The sorting out of those that will be for the best adornment of the particular garden, and that will enhance each other's beauty by a right companionship, is a great forward step. As the desire for such an act of progress arises, so will the intelligent pleasure in gardening increase—the learner will be unconsciously teaching himself, and his advancement in garden knowledge and garden judgment will thenceforward be rapid.

It is the rule rather than the exception that arrangements of flowers in rooms are made in good taste. It is generally understood that the old tightly-bunched mixed bouquets of fifty years ago are things of the past. In most houses the mistress or her daughters arrange the table flowers with simple good taste, using one kind of flower at a time, or some pretty mixture of not more than two or three kinds of blossom and foliage. They also choose their flowers so as to suit the colouring of the walls, and soon get to know the kinds and colours of the blooms that seem most happy to accord with the various places where it is desirable to have the bouquets. They find that the room insists on having certain things in certain places. One place may ask for white flowers with rather bright green foliage. Another place may demand those of an orange colour. Another again wants crimson, and so on.

It is safest certainly to begin with the simplest arrangements of some one thing, taking care to place them so that the flowers show themselves at their best and stand up as a handsome sheaf; enough but not crowded; with a few of their own leaves, and in such a jar as will hold them easily and comfortably, with plenty of water, and all their stalks reaching to the

bottom. Flowers take kindly to careful arranging; they seem to understand what is required of them, so that however well and carefully they may have been placed in their jar, they will be found next day to have accommodated themselves so well to their position that they are even better than before. Many of those who are accustomed to pick flowers for indoor use will have noticed a curious thing—how often it happens that the flowers seem to arrange themselves in the hand, and can scarcely be bettered afterwards. This is especially the case with bunches of Roses. It may be that unconsciously each Rose as it is cut and transferred to the left hand is put there with some idea of balance.

Making a Garden.

(By Penrhyn.)

Man is a gregarious animal; he is also a gardening animal, and wherever he is an innate, inherent love of gardening must assert itself. What he often wants to know is: How to begin? Well, first there is

— The Soil. —

At the very outset, and, indeed, all through the chapter, I would emphatically assert that the soil is at the bottom of all good gardening. There are various ways of looking at this statement. Some may treat it as a joke; some may regard it as a truism; some as a sound, common-sense dictum. The latter is the sense in which it is now put forward, and it is incontrovertibly true, to the last spadeful of mould, the last clod of earth, the last grain of sand in the garden With good soil and plenty of it, you can grow everything; with poor soil and plenty of it, you can grow a lot; with poor soil and little of it, you can grow weeds and weary—and precious little besides.

But here, at the very start, some unlucky gardeners get their first set-back in the handicap; it may be to scratch; it may be a few inches nearer to the limit man, according as our soil is poor and plentiful or poor and scarce. However, there is this beautiful thought underlying the question of garden soil, and it is worth dwelling upon, viz., there is always room for improvement. There is no need for the gardener to stand, Alexander-like, and sigh for fresh worlds to conquer: they are here, literally and absolutely at his feet, and my advice to him is to go in and win. A healthy spirit of enquiry is good to foster at the outset, and a spade and fork should be called in to help. Armed with these proceed as far in the direction of the antipodes as the land will allow; it may be six inches; it may be two feet If it is only six inches, make it two feet; if it is two feet make it three feet—always strive for a little more than you have got. Remove all empty tins, broken glass, stones and brickbats encountered by the way, and put them in a heap; they may come in very useful later on for paths, &c.

In digging down, it may be one foot, two feet or three feet, keep the bottom soil always at the bottom, but break it up with the fork. On this place a six inch layer of the best manure the nearest stable can supply; this should be rather old manure, but not so old as to have become hoary, as is common with many manures that have lain long in heap. This layer of manure should have a six-inch layer of the adjoining soil thrown on to it, followed by an intimate mixing of the two with the fork. Six inches more manure, six inches more of soil admixed, and the top six inches of soil is returned to cover all, unmanured and unbroken, simply inverted or turned over as it leaves the spade or fork. This deep trenching will open up store houses of plant food that have previously been locked, and the difference, especially during a dry summer, between plants grown on soil that has only been dug nine inches deep and those on other that has been trenched 24 inches deep will be very marked. The roots of most plants will penetrate the soil to a much greater depth than is generally supposed, providing the substratum is broken up sufficiently to enable them to do so. That is all for now; but it leaves a bed of soil which will grow anything or everything—that is, with a skilful grower to lend a hand at times.

(To be Continued.)

(Continued from page 529).

tive in a general bed or border. It is the sort of plant which seems most appropriately placed in a bed to itself, in a not too conspicuous position in the garden. Especially is this so, if the grower intends to try to raise exhibition blooms. In preparing a bed, take out the top soil and loosen the subsoil, working in some old manure and leaving it fairly firm. If available, mix some soot with the top soil, and as Carnations are said to have a special liking for sheep manure, use this instead of stable manure, if it is easily procurable. Firm the soil as it is returned, for the Carnation undoubtedly likes a pretty stiff root run, but it is easy to overdo the tramping business. In setting the plants, rows one foot apart with one foot to eighteen inches in the row, in a bed four feet wide, will prove a satisfactory arrangement, as it permits of all the necessary tying, staking disbudding, and protecting (for exhibition blooms) without trampling on the bed. For ordinary garden work, planting may be closer; the tying, &c., may be largely dispensed with, and the result will be an addition to the beauty of the bed as a whole, even if that of the flowers individually is somewhat lessened.

— Sweet Pea. —

It has been said that the quality and quantity of the Sweet Pea crop may be accurately measured beforehand by the depth and thoroughness of cultivation. Possibly this may, to a certain extent, be correct though there are, no doubt, other almost equally important factors. The ordinary gardener will be quite willing to let up a little in quality, if it is only to be obtained at the cost of burrowing into the bowels of the earth. Enghteen inches is a fair thing, and two feet liberal. Thoroughly work the soil to this depth and the same width, mixing stable manure with the lower spit, and a dusting of super with the top, and any failure, provided subsequent treatment is equally liberal, to grow sweet peas equal to and better than your neighbours is not a likely contingency. If the seed is not already in, planting should be done at once. If the ground is not ready, it is better to sow in pots, jam tins which have been through the fire, strawberry punnets, or on the earthy side of thick blocks of good fibrous turf, which can be cut into small squares when the seedlings are up. Either of these methods will give time for well preparing the positions the plants are to flower in, which may now be occupied, and in any case it saves a lot of trouble in protecting the seeds and seedlings from the too earnest attentions of the mouse, the sparrow, the slug and the snail. Peas make a lot of root growth with very little show at the top, so that care must be taken to see that the seedlings do not become potbound.

— General. —

Give buffalo and couch lawns a final cut, spread over them some fine sandy loam, and brush it well in. Prepare ground for hedges to be planted next month, also for any deciduous trees, shrubs, and climbers, which it is intended to plant. Give a little weak liquid manure to all early sown Stocks, Pansies, Cinerarias, &c., which should now be making good growth in their permanent flowering quarters. Get the best and last of the Dahlias and Chrysanthemums by clean picking and by liquid manure. Watch for weeds, and nip them in the bud. Clip hedges. Collect leaves, but don't burn them; better give them to a neighbour who knows how to appreciate their value.

Good Roses.

— Three Valuable Lists. —

Readers will remember that some months ago the National Rose Society, following upon a suggestion made in "The Mail," appointed six members to select what they considered to be the 12 best garden roses. This has now been done and the following list handed in:—

1. Gruss en Teplitz, crimson.

2. Madam Jules Grolez, china pink.

3. Antoine Rivoire, flesh pink.

4. Madam Abel Chatenay, salmon pink.

5. General McArthur, bright crimson.

6. Madam Lambard, soft pink.

7. Kaiserin Augusta Victoria, deep cream.

8. Laurent Carle, carmine.

9. Belle Siebricht, deep pink.

10. Rose De Evian, purplish crimson.

11. Countess of Gosford, salmon pink.

12. Lady Roberts, apricot and buff.

The selectors added—"We recommend also further Lena as a yellow variety; but, on account of it having only been grown here for a few seasons we do not think it has been proved long enough to justify us in including it among the first 12. Molly Sharman Crawford as a white and Mrs. Aaron Ward as a deep apricot are also valuable roses, on account of their colour. Care has been taken not to include any rose that has not been absolutely well tried for some years."

We understand that the points chiefly considered were "that they should be ever blooming roses, good strong growers, should hold their blooms erectly and that the twelve should include as good a selection of colour as possible.

The Society very wisely took advantage of the opportunity and requested the selectors to further choose :—

—The 12 Best Exhibition Roses.—which they did as follows :—

1. White Maman Cochet, cream shaded pink.

2. Mrs. Edward Mawley, pink.

3. Belle Siebricht, bright pink.

4. Mrs. John Laing, soft pink.

5. Maman Cochet, pink shaded carmine.

6. Mrs. David McKie, cream.

7. Konigan Carola, pale pink.

8. Frau Karl Druschki, white.

9. Alliance Franco Russe, deep yellow.

10. Bessie Brown, flesh pink.

11. Climbing Liberty, crimson.

12. Prince Camille De Rohan, blackish crimson.

Other roses mentioned as among the best were William Shean, Duchess of Portland, Gloire de Chedane, Guinnoiseau, Lady Ashtown, Lyon Rose, Mrs. Theodore Roosefelt, Medea, Mrs. Myles Kennedy, Robert Duncan, Souvenier Marie de Zyas, and Yvonne Vacherot.

In addition the selectors chose—

— The Best 12 Climbing Roses. —

1. Climbing White Maman Cochet, cream flushed pink.

2. Climbing Maman Cochet, pink shaded carmine.

3. Cloth of Gold, yellow.

4. Noella Nabonnand, crimson.

5. Climbing Belle Siebricht, bright pink.

6. Reine Marie Henriette, reddish crimson.

7. Madam Jules Graveraux, pale buff.

8. Reine Olga De Wurtemburg, bright crimson.

9. Bardon Job, blackish crimson.

10. Sinica Alba (The White Macartney), white.

11. Souv. De Leonine Viennot, heliotrope and pink.

12. Lady Waterlow, pale pink.

Two other roses were in the running, viz., Climbing Comtesse La Barthe and Sinica Anemone (The Pink Macartney).

The above lists are without doubt very valuable, they come at an opportune time and the gentlemen who have no doubt devoted time and careful thought to their preparation, well deserve the grateful thanks of many a hitherto greatly perplexed rose lover. The 12 best of anything is a big proposition, but in the matter of roses at all events, the question appears to have been settled for some time to come.

— Successful Selectors. —

In competition for the prizes offered, Mr. T. O. Sobels, of Semaphore, was placed first with ten correctly named. Mr. Sobels substituted Mrs. Aaron Ward and Lady Battersea for Kaiserin, A. Victoria and Rose D'Evian, whilst Mr. H. Johns, who also picked ten correctly and was awarded 2nd prize, selected Lena and White Maman Cochet to take the places of Madam Lambard and Countess Gosford.

Then next came W. Heddle, Glenelg, with 9, and G. Wilmshurst, Tennyson Street, Medindie, with the same number. There were also five others who had 9 correct, but in order of merit they lost points. These were :—F. Liversidge, Malvern ; John Wesley, Gawler ; V. Hocking, Yelland ; D. P. Evans, Dulwich ; and Ethel E. Ellis, Bowden-on-the-hill.

The Unley and Kingswood Nurseries.

Roses are as much, or more, to the fore than ever, and there is every probability of this season's plantings being the largest on record. This being so, readers will be advised to get in their orders without delay. The stock at the Unley and Kingswood Nurseries is, as usual, very large, but it is astonishing how quickly the orderly and apparently endless rows of healthy well-grown roses will disappear when once planting commences in earnest. As to the quality of the stock, it is not necessary to do more than refer to past successes, and to the fact that Kemp's roses are , favourably known throughout the Commonwealth. All popular sorts are, of course, largely grown, whilst there is an attractive selection af recommendable sorts which only need time to become so. In the novelty class the Unley grower has, as usual, endeavoured to get the cream of the English and Continental production. Mr. Kemp is so widely known in connection with roses that one is apt to overlook his success with Dahlias of all types, tuberous Begonias, carnations, etc., in all of which he has got together collections of great merit. For present planting Mr. Kemp has a fine stock of shrubs, climbers, and hedge plants, in addition to many of the best perennials and all the popular spring flowering annuals. His price list and catalogue are to be had for the asking.

The Harvey Cultivator.

During the month a very satisfactory demonstration of the working of the Harvey Cultivator, of which Messrs. Prevost & Co. are agents, was carried out through the courtesy of Mr. C. C. Ragless, on his property at Edwardstown. The company assembled to witness a test of the implement, and judge of its value, expressed their pleasure at the thoroughly satisfactory manner in which the work was done.

Transplanting Plants.

Transplanting is the process of removing a plant from a place where you do not want it to grow, to a place where you do want it to grow.

With many plants it is a saving of time and space if seedlings or small plants may be planted in small beds of well prepared and well tended soil, later to be transplanted to a more permanent location. There is, I think, no doubt that when small plants or seedlings are to be transplanted later a better root system will be formed if the soil is not too rich, and contains a moderate amount of sand. It should also be well worked up so as to be in the best of condition or tilth.

Before transplanting, the soil to which the plants are to be removed should be thoroughly prepared. Experience has taught that this previous preparation of the soil is very important, not only for the better future growth of the plants but also for greater speed of transplanting.

If the ground is in ideal condition for planting it will be moist enough to hold its form when squeezed in the hand but not wet enough to pack or cake. During dry weather this may be accomplished on small areas by watering and stirring the soil until the right condition is reached. On larger plots of ground where it is not practical to water the whole surface it may be possible to water the rows that are to be planted.

— Importance of Moisture. —

The plants to be transplanted should be thoroughly watered some hours before being dug, so that they will be well filled with water when moved, and so that they will separate with better roots. It is a great help with most plants to lay them out in a row on the ground, as they are dug, and sprinkle the roots with a hand sprinkler or small pump, and then scatter soil over them. The soil sticks to the roots and holds them from drying out as quickly. This is preferable to the usual method of puddling, as it leaves the roots spread out and in a better condition to handle.

If the plants have become drawn from crowding, or if the tops are out of proportion to the size of the roots the tops should be cut back. If the roots are too large to handle easily it may be well to trim them back.

Plants that have been received from a distance should be unpacked at once. Lay them out in rows, and sprinkle the roots with water and soil as described before. In case they cannot be planted out at once, heel them in until they can be planted. If the plants come with the roots encased in a hard ball of earth, as small potted plants are often received, loosen the soil somewhat by squeezing with the fingers, and then sprinkle the roots thoroughly several times, or set them to soak in water before potting up or planting out. If this dry ball of earth is not thoroughly moistened before planting, new roots will be very slow to start into active growth.

There are a few general principles to be observed in the process of transplanting:—The soil should be pressed firmly enough about the roots that they are in close contact with the soil and soil moisture; the hole should be of such size and shape that the roots are not doubled up or bunched in a wad. Most plants should be set to about the same depth that they were before being moved.

— The Trowel. —

In planting with a trowel see that it is strong enough at the neck to prevent breaking or bending in hard ground. Be sure that the edge is sharp and the blade well polished, as this makes a very great difference in the speed and ease of planting. In making the hole, drive the trowel well into the soil, slanting it but slightly. Do not pry the trowel over to make the opening, but draw the whole blade toward you, so that the bottom of the opening will be nearly as wide as the top. This allows the roots to drop their full length in the opening. Then take up a plant with the other hand, holding it just above the neck or place where the root and top joins, drop the roots into the opening and hold the plant at the right height while the trowel is being withdrawn. Then with the handle of the trowel or knuckles press the soil up firmly about the roots, giving a slanting pressure that will close the opening the whole depth. If the pressure is placed too close to the plant, only the surface will be firmed and the plant may be snapped off at the neck by the downward pressure. The amount of pressure necessary depends very much on the variety of plant and the condition of the soil.

Many planters prefer the dibber or some modification. A dibber is of a heavier build than a trowel. Instead of a thin blade, as with a trowel, the dibber is round and pointed, or flat and much thickened at the centre. The size varies with the plants, and they may be made of wood or polished steel or iron. This is thrust into the ground to the proper depth, given a twist to firm the soil about the opening, enough to prevent loose soil filling the hole, and the plant inserted as the dibber is removed. The soil is then firmed about the roots of the plant by thrusting the dibber into the ground a short distance from the plant and prying the soil over against the roots.

Many planters have some special way of doing some of the processes. and methods differ largely in detail. Often in loose soil, the fingers are the only tools used to make the opening for the roots. Practice and common sense are most needed if large quantities of plants are to be set by hand.

Planting machines are common in America, and are used to transplant strawberries, cabbage, tobacco, and tomatoes when the area to be planted makes their use possible. They seem entirely practical under certain conditions, and seem great labour savers.

After transplanting, further care is necessary to ensure a good start. Where it is possible to do so, watering and shading help to establish the plants, unless cloudy or rainy weather prevails. If watering is done at all it should be enough to really reach the roots. A light sprinkle does little but form a crust on the surface of the ground, which allows more rapid drying out of the soil. If watering is done, stir the soil well as soon as dry enough. When the plant is once established. cultivation is more important than watering except in the hotter months, when both are essential.

Pruning Shrubs and Trees.

Trees can often be improved in appearance by trimming occasionally or cutting back in order to correct irregularities, or to attain some form better adapted to the situation. Such work can be done without injury to the tree; but it can be undertaken safely only by a careful pruner. This work should not be entrusted to any ignorant, casual odd jobbers who may solicit employment as tree pruners. With glib tongues they describe the defects, real or otherwise, in trees, and often obtain permission to do some work. As a result, beautiful specimens have been disfigured or irremediably injured.

Pruning is necessary at times, the same as surgery, and is successful only when skilfully done.

The best time for pruning is soon after the leaves have dropped. Trees may be pruned in the spring with safety, but it must be done early and before there is any swelling of the buds. Whenever a branch is removed, whether a dead or a live one, it must be cut off close to and even with the trunk, no matter how large the wound. The new wood and bark will then, in time, cover the denuded space. If a branch is not cut off close to the trunk, the projecting stub soon decays, its bark falls off, and the stump remains "like a plug of decaying wood driven into the trunk;" from which the rotten mass extends rapidly to the heart of the tree.

All wounds made in pruning should be covered with coal tar or white lead to exclude the air from the raw surface. Coal or gas tar, by penetrating the pores of the wood, acts as a preservative, and at the same time prevents the inroads of fungi and insects.

It is a misery to see how trees are defaced and mangled by unskilful men, who hack and chop all that comes in their way; by which trees are made full of knots, stabs, boils, cankers, and deformed branches, to their utter destruction.

Artificial Manurs for the Garden.

Many plants—in fact, most—particularly need phosphates, because these are most lacking in ordinary soils; others are especially benefited by potash, though not so frequently as by phosphates, and all garden crops are partial to nitrogen. But in a garden in a good state of cultivation, phosphates are more likely to be deficient than nitrogen, while potash, especially if yard manure has been used, will often exist in plenty. Something, then, depends on the soil as well as on the individuality of the plant, and this is apt to be forgotten. People may rush to a nitrogenous manure as sulphate of ammonia for Rases and Carnations, and possibly grow too much leaf instead of bloom if the land is already rich, because nitrogen is very apt to produce this effect if not used in moderation; or they may give lime when this has been already supplied in the shape of basic slag or bone-meal. Give nitrogenous manure where leaf is required, by all means, or to lawns; but give it to Nasturtiums, and the flowers will be mere adjuncts to enormous and numerous leaves.

Potash is useful for potatoes, for Carrots and Parsnips, also for Asparagus, and especially for Onions. Kainit or sulphate of potash will supply it well.

Nitrogen is useful, generally speaking, for luxuriously-growing and leafy plants, hence it is excellent for such succulent stuff as cabbage of all kinds, lettuce, the grosser feeding pot plants and flowers of this kind; but it is more expensive, quicker acting than phosphates or potash, and should be used with discretion.

There remain, then, phosphates, cheap, handy and useful as they are. It must not be expected, however, that they will give so immediate a return as nitrate of soda; for basic slag and bone-meal, for example, take some little while to become soluble. Phosphates give strength and vigour.

One is sometimes asked if superphosphate of lime is the same as the ordinary lime. It is very different. Ordinary lime is not really a manure, only a tonic to the soil, while superphosphate supplies phosphoric acid in an active form as well as some lime of special kind, which will not take the place of the other kind. It should be applied in the early stages of growth.

Wood-ashes supply potash and lime, and is often better than richer manure. At any rate, it forms a useful foundation for many plants, and in a very cheap form. Soot or some super phosphate may be added to this, and all three constitutents of plant-life are provided. Soot supplies nitrogen in a cheap and active form, and not too freely. It is useful for any plants, and is good mixed with water and given in liquid form. It may be used more freely than guanos, nitrate and other forcing and expensive manures, and is not so likely to have their effect—especially to be avoided in manuring flowers—of inducing a luxurious leaf-growth at the expense of blossom. Such, briefly, are some of the principles which underlie the use of mineral manures in gardens.

Flowers for the Garden.

— The Forget-Me-Not. —

Though naturally a shade and moisture loving plant, this beautiful perennial can be grown quite successfully in any suburban garden, especially if a little care is taken to give it a partially shaded position. For such a border which wants brightening up one might do much worse than give this modest little flower the opportunity of proving itself. To be really effective it should be planted in quantity. As a border edging eighteen inches to twice that width, it is very charming, whilst as a carpet for a bed of daffodils, both gain in beauty by the delightfully contrasting colours. There is just one point the grower must decide on before trying to grow the forget-me-not and that is the banishment of all slugs and snails. Either of these pests will leave a succulent petunia or juicy delphinium to tackle a forget-me-not, and that's pretty conclusive evidence of their fondness for it. It is very easily grown either from seed or by division of the roots. Sow the seed now in boxes or seed pans, filled with a nice sandy loam. Cover lightly, after sowing the seed, and water with a fine rose can. Cover it with a pane of glass and the seedlings should appear in about a week's time, when the pane of glass should be removed. Prick the seedlings out into boxes as soon as they are large enough to handle. Transplant them out into a nicely-prepared and finely-dug bed, as soon as large enough. Seed germinates so readily that it is best treated as an annual, and a fresh stock raised each year. The more dwarf growing and compact the variety the better. The recently introduced "Ruth Fischer," is said by those who have grown it, to be quite one of the best.

— Lachenalia. —

A very pretty plant is the lachenalia, or Cape cawslip. It is a bulb that can be planted now. It bears spikes of brightly-coloured flowers that make effective groups in the garden amongst the perennials, or as a border. The leaves, too, have a beauty of their own, being spotted with circular brown spots on a dark-green background.

They are extremely hardy, and may be said to flourish anywhere, and yet with a little extra care they may be made to produce foliage and flowers twice the size of those ordinarily seen. The soil they particularly delight in is a mixture of very rotten dung thoroughly mixed with a rich sandy loam. They must be kept well watered from the beginning, and must not receive a check from drought. As soon as the flower spike shows itself give a dose of weak liquid manure once a week.

The lachenalia also makes a splendid pot plant for table decoration. Use a 6-in. pot, well drained, and filled with a sandy potting soil. Plant six bulbs in each pot. In planting let there be at least an inch of soil above each bulb. Give liquid manure when the flower buds appear.

— The Chionodoxas. —

This little interesting bulbous plant, sometimes called Glory of the Snow, is one of the earliest of the spring flowering bulbs. They grow readily from seed, and multiply quickly if once established They are quite dwarf in growth, and make a pretty covering for a bed of taller growing bulbs.

— Gaillardias. —

Gaillardias are well known, popular plants which resist drought and heat better than most plants There is no difficulty in growing them; they seed freely, and so perpetuate themselves for a long period. For the best results the ground should be deeply dug, and enriched with manure. For cutting they are indispensable, their gaudy blossoms lasting a long time. Some English catalogues contain as many as 80 named varieties, but there must be a great sameness in them, as the prevailing colours are yellow and crimson with many intervening shades. The plants are most easily propagated by seed and by division.

— The Lupins. —

Very stately plants are the perennial lupines. Lupinus polyphyllus and its white variety are extremely showy when planted in groups or clumps; they sometimes attain a height of 6ft., but usually they are not quite so high. The blue kind is particularly handsome, and it succeeds in any ordinary garden soil. Somerset is a soft yellow. It is a somewhat new variety.

— The Cardinal Flower. —

Distinct and showy is the "Cardinal Flower" (Lobelia cardinalis). The colour of the flower is a vivid scarlet, and some varieties have purple leaves. Their cultivation need not be attempted unless plenty of moisture can be afforded during the dry season, and in the summer they may be treated almost as semi-aquatics.

— The Bermuda Lily. —

This is a splendid variety of the lilium tribe for outdoor culture, producing trumpet-like, pure white flowers of grand substance, and great lasting qualities, and having a most delicious fragrance. Add a little of the product of the compost heap and sand to any ordinary garden soil. The bulbs should have 5 in. of soil above the crown when planted. When moving them, from one place to another keep them out of the bed as short a time as possible, for the lily, unlike other bulbous plants, quickly deteriorates when kept out of the ground. Take away the little bulblets found round the main bulb and sow them in a small bed to themselves. These will form flowering bulbs in another year. Liquid manure may be given once a fortnight, commencing when the flower stalk is 12 in. high. The Lilium Harrisii is often grown in pots. Use either 5in. pot or 10in., placing one bulb in the former, and three in the latter.

— The Mimulus. —

The mimulus, or monkey flower, is a curiously shaped and brilliantly colored flower, whose seed is easily raised. In sowing the seed fill a shallow seed pan with two parts leaf mould and one part clean loam, with a handful or two of silver sand. Sift the compost through a quarter inch mesh sieve, mix well, and fill the pan or pot. Make the soil moderately firm and even, then water it well, let it stand for half an hour, sow the seed, and cover it with fine soil to the thickness of writing paper. Cover the pan with a pane of glass and keep close until the seedlings are up. The surface of the pan must be kept damp, but the seed will probably be up before any water is required, if the watering of the soil in the seed pan is attended to previous to sowing of the seed. Carefully shade the young seedlings, give air, and prick them out to the number of ten in a 5-in. pot of fine earth, in which a little peat has been mixed, as soon as they possess six leaves; then pot them off singly into 3-in. pots, well drained and filled with a soil compounded of peat, loam, and sand. From these they may be moved into a 5in., in which they may be bloomed. They delight in a shady situation, and detest one where the direct rays of the sun can fall upon their leaves. Above all things keep them well watered. They will do in the open garden if planted in a

situation similar to that recommended for forget-me-not. Although the mimulus is a perennial and capable of being propagated by cuttings, it is best to treat it as an annual and raise fresh plants from seed each year.

— The Spanish Iris. —

Spanish Irises are popular on account of the brightness of their colours, the great amount of variety, and the number of colours which usually blend with one another in one and the same flower. Of course, in the variety mentioned the colour is almost uniform or self, and at a distance may be regarded as uniform. A mass of it either in a bed or border gives a very handsome effect.

The cultivation of Spanish Irises is precisely similar to that of the English Iris, both belonging to the bulbous section.

Ground should be thoroughly prepared by deeply digging it and incorporating with it a quantity of well-decayed farmyard manure. It should not on any account be fresh, and in any case should not come in contact with the bulbs. Ground that had previously been manured would even be in a finer condition for receiving the bulbs of this Iris. In choosing the site for a plantation, sandy soil, or that containing a considerable amount of grit in it, well drained and open should be selected if possible. Spanish Irises are, however, easily accommodated, and if the soil is not naturally suitable it can readily be made so.

— Eulalia. —

This is a handsome ornamental grass, of which there are green and variegated varieties.

The ordinary form has green leaves with white midrib, but is not so frequently grown as the variegated. There is also a zebra-striped variety, hence the name Zebra grass, M. j. zebrinus, which has bands of yellow at intervals along the leaves. This is a very uncommon form of variegation in a Grass, as white or yellow variegation usually follows the lines of the venation, that is, the long way of the leaf.

If planted in good soil it makes splendid growth during the course of a season. It can be increased to any extent by lifting the clumps in spring just when commencing to throw up fresh leaves. Each crown with a few roots attached will grow. The grass grows easily from seed, which should be sown now. Average height is about 4 to 5 feet.

— Poppies. —

One who loves the beautiful Shirley poppies, beautifully and truthfully describes them as "the most perfect, dainty, and delicately beautiful flowers ever evolved by the patience of man. Their petals are of a texture so filmy and light that the wooing bee can destroy their bloom. To liken them to silk or satin is to compare them with the coarse and inferior fabric's of man's manufacture. The tints are the perfection of a heavenly colour scheme—the purest white, the roseate hues of dawn, the tints of sunset clouds deepening into richer shades of crimson, and the blending of these together in the exquisitely adjusted petals, and the delicate darker fibres of the seed vessel form a combination hardly to be found in any other of our annuals. The buds that burst from their enshrouding calyx of tender harmonious green are spangled with the morning dews, and crinkled like a web of silkworm's silk. As the breeze shakes their pendant heads they lift them unto the Lord, and in a few moments become perfect flowers, fragile—ephemeral, if you will—but lovely as such things always are. I have stood among my Shirley Poppies and from my grateful heart I have thanked the man, the clever, patient gardener, who evolved their beauties out of the wildling of the Cornfield." Though poppies transplant fairly well, it must be very carefully done, and if the seed can be sown now where the plants are to flower, so much the better. The bed should be well dug and the surface raked very fine. Sow the seed thinly all over the bed, firm the soil gently and sift a thin layer of old cow manure over it. When the plants are up thin out as they grow to 10 inches apart.

— Nemesias. —

Quite a wide range of colour is to be obtained from this flower, varying from pale lemon to purple and from white to deepest crimson, with a predominance of pleasing shades of orange. Its cultivation is quite simple. Seeds germinate quickly when sown either in pots or boxes or in the open ground. The Nemesia is not in the least particular as to soil. Any ordinary garden suits it quite well, and good results may be obtained on poor and stony soils. The plants should be bedded out from 6 inches to 9 inches apart. When grown either in a border of annuals or in a flower-bed on the lawn, the Nemesia is sure to give a good account of itself and to gain general admiration.

The Gembrook Nurseries.

The Gembrook Nursery catalogue for 1913 is to hand, this being the twenty-second year of its publication. Like its predecessors, it is excellently got up. The cover is effective, the printing and arrangement are both good, the coloured illustrations of a number of varieties of apples are beautifully finished, and what it is of much more importance, it deals with the largest collection of fruit and other trees to be found in the Commonwealth. The Gembrook Nurseries cover 200 acres af ground, and contain two and a half million plants, of which one million are ready for despatch this season. As an instance of the scale on which things are done at Gembrook, we notice a photograph showing part of a block containing 90,000 apple trees. Mr. Nobelius has always made the cleanliness and freedom from pests of his stock a point of special importance. The nurseries are periodically examined and a clean certificate can be forwarded with each consignment if required. A copy of this catalogue, which everyone interested in tree and bush fruit culture should have by him, will be promptly despatched on receipt of request. We should mention that a fine assortment of ornamental trees and flowering shrhbs for cool country and general planting is included therein.

Dry Country Hedges.

In the most carefully kept gardens, it is usually the hedges which receive least attention, for most gardeners appear to think that a hedge is something to be periodically cut but seldom, if ever watered or manured. Hedge plants are usually hardy plants, and where there is a reasonable rainfall, this neglect does not trouble them a great deal. In the dry country, however, the gardener must either choose his hedge plants to suit his conditions or given them the necessary moisture, and the latter course is often next door to impossible. Under these circumstances one's choice of suitable plants is somewhat restricted, but either of the following will thrive on a very small, natural rainfall, pepper trees, carob trees, tree lucerne, saltbush, and some of the acacias, and even these may want some assistance during the first summer.

Japanese Garden.

Japanese gardeners are said to be the cleverest in the world. Those who have visited the Land of the Rising Sun tell us that what has been most noticeable to them has been the dignified simplicity of the little brown man's conception of the art of gardening. Impossible as it may seem, the Japanese gardener appears to be able to combine hill and dale, woodland and water, stonework and timber all within an area which may be measured by the square yard and yet preserve a sense of space and freedom and an entire absence of that overcrowding which is one of the worst faults of Australian gardening. And he does so principally because of his understanding of the relative values of what he uses and an extra ordinarily acute sense of proportion. To read of a Japenese garden may suggest to one's mind a child's toy puzzle, but to see one is we are told an artistic revelation. The "Florists' Exchange" writing on the subject says :—

Contrary to the formal gardens which we admire so much, the Japanese is obstinately against them ; he goes so far as to call it bad taste. The Japanese does not like regularity ; even in his different structures he deviates from straight lines.

When locating their ground, one of the first requirements of the Japanese is a southern exposure, as the summer breeze generally prevails from that direction.

The Japanese gardens are divided into two classes, viz., the hill garden and the flat garden. The hill garden is generally given the preference, and no hard work is spared in making or moving a hill where wanted. Either on a large or small scale, the hill garden usually consists of the following :—Four or five hills are made all of different side and must look quite natural ; the two hills nearest the residence must be low, but show long slopes ; the next two hills are higher and steeper but not uniform. The meeting of these slopes should form a valley, through which you have a view of the fifth hill, placed at the farther end of the ground ; this latter is quite steep and higher than any of the rest, in order to give it the appearance of a distant peak.

Certain trees are found as regularly in a Japanese garden as though their existence there were imposed by law. They consist of the following, in order of importance :—

Shajin bokn (the principal tree), usually a fine pine. Keyo-bokn (perfection tree), always a tree of very fine appearance. Sekizen-bokn (tree of solitude), accompanied usually by more trees to make a solitary spot. Sekiyo-bokn (sunset tree), usually found in the western part of the ground, and is intended to shade the garden from the setting sun. A red or bronze foliage tree is usually preferred for this—maple, beech, or plum. Mecosi-natsu (perspective tree), partly concealed and planted a diseance away to give a fine perspective. Nagasaki-natsu (weeping tree), usually planted in the foreground, overhanging a stream.

The above-mentioned trees are never omitted in a Japanese garden. Besides them we find a eich collection of other plants, such as Camellia japonica, Aucuba japonica, Azalea formosa, A. mollis and A. amoeaa, Pyrus japonica, Wistaria siensis, Iris Kaempferi. Among grasses we find Arundo donax, Eulalia japonica, Bambusa nigri, B. aurea and B. Fortunei. The evergreen collection is admirable, consisting mostly of dwarfed specimens ; some varieties are trailing, such as Juniperus chinensis procumbens, which is wonderfully well adapted for covering rock-work. There are also the Japanese red pine (Pinus densiflora), some piceas, and a list too long to mention, mostly cultivated in pots of wonderful small dimensions. I must not forget to mention the Japanese maples, which we all know by reputation on account of their brilliant colors and also some Japanese fern balls (Davallia) of all shapes imaginable.

Stones are indispensable in a Japanese garden. There are many of them, but the following ones cannot be omitted :—The Worshipping Stone, usually placed at the centre of an island, and accessible by stepping stones. Dedication Stone is placed in the middle of the ground. Moonshadow Stone is placed away off on the showing slope of the steepest hill. The seat of Honor Stone is usually found under the tree of the evening sun. The Guardian Stone is generally placed in a most prominent position. There are numerous and other named stones, in size and number, according to the importance of the estate ; they are placed in harmony with other stones and always imitate nature as nearly as possible.

To complete this garden we find a stone lantern, whose light reflects on the water. This stone lantern, together with stone basins, are found in every Japanese garden. The garden usually includes a small bridge, stepping stones across a stream, rockeries, and statuary representing birds.

Japanese gardens existed centuries before European gardening. This is due to the comparative freedom that country has always enjoyed, whereas in Europe the lords of feudal times were always fighting among themselves, and had to use their grounds for entrenchments and fortifications, while the Japanese were enjoying the beauties of nature. Therefore it is justly due to Japan that she should be called "The Flowery Kingdom."

Vegetable Garden.

Basic Slag as an Insecticide.

· Journal of the New Zealand Department of Agriculture.

Basic slag, that one-time residual waste of the steel blast furnace—the dross formed in the removal of phosphorus from iron ore—is not only proving a fertilizer of great value in this country, as well as an excellent corrective of acidity in the soil, but it is well known that root crops manured with slag are not affected with certain diseases which are often present when other manures are used.

Now, according to an investigation in France, basic slag is proving of distinct value in the destruction of the plant louse. In Europe this insect has been very destructive, especially to sugar beet. All mixtures or liquors used for spraying plants as a protection against these insects have been applied in vain.

It has been found that by the application of large quantities of nitrates after rains, the beet is stimulated to push out new leaves, which take the place of those destroyed by the plant lice. But this method has its dangers since an excess of nitrogen in the soil may be just as harmful to the plants as the action of the insects.

J. P. Wagner, a sugar-beet expert, recently told the National Society of France of a successful attempt to fight these insects by means of basic slag. He spread about 1,400 lbs. of the basic slag to the acre on fields that were infested with the plant louse. Not only did this treatment prevent the insects from attacking the leaves, but they were driven away from leaves they had already attacked. On another field the slag was applied in larger quantities. Every plant was already attacked by the insects when the dross was applied. Within eight days all the insects had disappeared, and the plants recovered their healthy appearance and colour.

The method by which the basic slag operated in these cases is not known. Wagner thinks that the compound forms a thin layer on the leaf, spreading out over the whole surface, and that it is either distasteful or injurious to the insect. It is well known that many lime compounds are injurious to animals with soft, naked skins, such as snails, caterpillars, naked larvæ; but it has not been shown that a similar effect is actually produced in the treatment against plant lice with basic slag.

Asparagus.

There is probably no vegetable the flavour of which is so highly esteemed as is that of tender asparagus. Chemical analysis offers no explanation of its pleasant flavour, but assigns to it a decidedly high nutritious value. Asparagus, however, furnishes one of those interesting examples of a food which, though containing more water in its composition than does milk, is nevertheless a solid substance. Thus the head of the asparagus contains slightly more than 93 per cent. of water, which is only 1 per cent. less than that contained in the lettuce, but 5 per cent. more than is present in milk. The solid constituents, however, are particularly rich in nitrogenous substances, which amount to 30 per cent. of the dried vegetable.

Asparagus is not as popular as it ought to be with the amateur gardener, partly because the crop occupies the ground for the full twelve months, or, it may be, ten times twelve months. The fact that it is a permanent crop cannot, unfortunately, be overcome, nevertheless we believe it to be one of the most "worth-while" vegetables in the whole catalogue. In fact, everyone possessing a kitchen garden, no matter how small, should have one or two asparagus beds. There is no reason why asparagus should not be as common and reasonable in price in season as any other vegetable, and now is a good time to form the beds.

—How to Make an Asparagus Bed.—

A good width is 7 ft. wide, and of any length desired. If there are two or more beds side by side, the distance between them should be 3 ft. The soil should be dug out of the bed to a depth of 2 ft., and placed in the space between the beds, as it will be wanted to cover these with by-and-by. On the bottom of the bed should be placed a good layer 6 in. thick of manure and refuse from the rubbish heap, ashes, bones, &c.

Dig it in and mix it with the bottom soil of the bed, afterwards treading the dug ground gently with the feet. The treading must only be carried out when the soil is fairly dry. On the top of this place another layer of richer and more decayed manure—say, 4 in. thick—lay over this 4 in. of the soil near by, mix it well, and tread the whole down. Add another layer of very fine old manure, and the remainder of the soil, thoroughly mix this and, after raking over, it will be ready to receive the young roots.

A bed 7 ft. wide will hold five rows—one in the centre and two each side, 18 in. apart and 2 ft. between root and root in the rows; or 4 ft. wide is, perhaps, more convenient, and holds three rows. Two-year-old plants are the best for planting, and these may be procured from any local nurseryman. The bed may be planted any time between May and August. The roots should be laid on the surface of the prepared beds at the distances apart given, and then each covered with a good spadeful of soil. This should be pressed firmly about the roots, covering them over with 3 in. of soil. Take care that the soft crown of the root is not injured by hard pressure. Add more soil to the surface, thus bringing it to the same level as the soil over the roots. Draw the rake over the former, and edge the sides of the pathways between with the spade.

A few heads of asparagus may be cut the second year after planting for about a fortnight while the rrop is at its best, but none the first year. The third year will furnish a good crop, and every year afterwards with little expense or trouble for a lifetime, provided it is kept clear of weeds in summer and receives a dressing of manure each autumn after the ripe grass is cut off. Conover's colossal is the best variety.

Vegetable Notes for May.

All exhausted crops should be cleared away to the rubbish heap and burned. The tops of asparagus plants are now turning brown, which is a sign that their mission is over, and they should be cut cleanly off to the ground, taken to the rubbish heap, and burned. The haulms of tomatoes should be cleaned away and burned, as should all waste fruit, for to leave them on the ground is only to encourage slugs, insect pests, and diseases.

Having cleared the ground put a dressing of manure and dig the ground deeply, and if it is not to be used until spring, leave it rough.

Continue to sow peas, broad beans, carrots, turnips, parsnips, spinach, red and white beet, kohl rabi, onions ; also all salad plants endive, leeks, and culinary herbs.

Continue planting out cabbage and cauliflower plants ; also celery and onions.

It is now time to think about the early tomatoes and cucumbers, but of course only in early districts ; and where the plants can be raised in hot beds and kept sheltered. It is worth trying a few cuttings from good tomato plants. Strike them in pots of sand, and when rooted plant them against a north wall in a sheltered place.

It is now time to plant beds of rhubarb, asparagus, seakale, and horse radish.

If alterations are to be made in the garden, now is the time to do it, for any plants may now be moved and reset without fear of loss. New beds of herbs should be made.

ASPARAGUS PEA.

It is a little difficult to understand how the asparagus pea came by this, its popular name, for it is quite unlike the ordinary garden pea, in that the whole pod is eaten as in French beans, nor will the ordinary person detect any resemblance to asparagus. It is an annual plant of trailing habit, with reddish flowers. In the Mediterranean countries, of which it is a native, the ripe seeds are used as a substitute for coffee. For use as a vegetable the pods should be picked when young and tender and boiled whole. It hardly comes in the catagory of a first class vegetable but is well worth trying by those who like more variety than the round of common vegetable affords. Seed should be sown now in well dug ground.

Pruning.

Among the many gardening operations that have to be performed as the seasons come round, few, if any, are more important and productive of good or bad effect, according to the manner in which they are carried out, than pruning, and it is probably not far from the truth to say that none is more imperfectly understood. Pruning is one of those gardening duties that it is almost impossible to teach on paper; it is essentially practical, and therefore it is difficult to teach theoretically. In this case, as also in many another important work of the gardener, an ounce of practice is worth a pound of theory; a few minutes' practical demonstration would teach more than hours of writing could do. It is not easy—in fact, it is impossible—to treat fully of pruning in one article, because there are so many different ways of pruning; certain classes of plants require certain sorts of pruning, and none other will produce such good results. The pruner should have a clear idea of the object in view before commencing to use the knife, otherwise it is easy to do much more harm than good.

— Flowering Habit. —

To take first those shrubs and plants that are grown for their flowers. Some bear flowers upon shoots made the previous year, while others will blossom on shoots that have yet to grow. It is, of course, all-important to know to which of these classes the plant to be pruned belongs. Take the rose, for instance; if you want the finest individual blooms possible from the plants you prune these back to a few buds, so that they may produce two or three strong shoots, each bearing one or more blooms.

If quantity is of more importance than quality, the shoots are not pruned back so hard; more shoots and more blossoms then result. If, on the other hand, a climbing rose is to be pruned, the long, strong growths are left to flower this year, and when the blooms are over, these shoots are cut out, and others are encouraged to take their place. Supposing the plant to be pruned is a shrub that bears flowers on the current year's shoots, like hydrangea, those made the previous year must be pruned hard back to ensure the production of vigorous growths. If, on the other hand, the flowers are borne on shoots made the previous year, these must be left intact.

With fruit trees, just as much, or perhaps more, care is needed, for in this case the operation is more complex. The fruit of apples, pears,

plums, and cherries is borne chiefly on spurs (specialised growths upon which flower-buds form), and the aim of the cultivator should be to preserve and encourage these. We see how in some flowering plants cutting back the shoots to a few buds at the base causes more shoots to grow. Precisely the same thing will happen if a shoot of one of these fruit trees is similarly treated, i.e., more wood growths will result. Now this is just what the fruitgrower does not want.

— Fruit Trees. —

It is evident then that pruning must be carefully carried out. Fruit spurs form naturally upon the shoots if these are not cut hard back. The motto of the fruitgrower should be to cut out rather than to cut back, for by cutting back more shoots will be incited to form, whereas by removing those for which there is no room the others are allowed proper space for development. So much for the principal shoots. The production of spurs upon them is encouraged by arresting the growth of side shoots during summer by pinching off the tops, so as to help the formation of fruit buds at the base. These must be shortened at the winter pruning. In the case of the Morello cherry and the peach the fruit is produced directly on the shoots. Therefore some must be retained almost their full length, and others be cut out to make room. We do not pretend to have entered deeply into the methods of pruning, but rather wish to show how important it is to know something of plants or trees before starting to prune them. With fruit trees even certain varieties need a special pruning, because of some peculiar characteristic they possess, either of habit of growth or manner of bearing. The person who prunes every tree alike without troubling to learn something about it beforehand can never hope to achieve success, neither, may it be said, does he deserve it.

Selected Fruits.

The selection of suitable varieties of fruits is a matter of some importance to the amateur who, as a rule, is more concerned about getting the very best quality than heavy crops of perhaps inferior fruit; he also, as a rule, wishes to secure a succession of fruits through the season. We have at various times published lists likely to be useful to such growers, supplied by Mr. Wicks and others. Last year we published two very complete lists, for which we were indebted to the kindness of Messrs. Wicks and Nobelius. They were prepared with special reference to the requirements of the grower of fruit for home use. With these lists to guide them, our readers need have no fear of making any mistake in their season's planting.

— Selection by Mr. Wicks. —

— Grapes. —

Cornelian, Royal Muscadine, Sweetwater, Crystal, Pedro Ximines, Black Hamburgh, Black Prince, Madresfield Court, Muscat Gordo, Muscat Hamburgh, Muscat Woods Red, Gros. Colmar, Black Alicante, Red Malaga, Frontignac, Lady's Finger, Waltham Cross, Black Malaga, Royal Ascot, Sultana.

— Six Dessert Apples. —

Beauty of Bath, William's Favorite, Gravenstein, Jonathan, Cleopatra, King David, or Rome Beauty

— Six Kitchen Apples. —

Lord Suffield, Twenty Ounce, Emperor Alexander, Prince Bismarck, Rokewood, Stone Pippin.

— Eight Pears. —

Wilder, Clapp's Favorite, William's Bon Chretien, Beurre Bosc, Glou Morceau, Laffer's Seedling, Josephine de Malines, Harrington's Victoria

— Three Quinces. —

Pine Apple, Mammoth, Smyrna.

— Three Loquats. —

Early Oval, Herd's Mammoth, Chatsworth Victory.

— Six Plums. —

Early Rivers, Early New Orleans, Washington Gage, Giant, Grand Duke, Jefferson.

— Japanese Plums. —

Climax, Burbank, Santa Rosa, Wickson, Kelsey, October Purple.

— Peaches. —

Sneed, High's Early Canada, Ulatis Truniph, Hales' Early, Peregrine. Carmen or Wiggins, Ruby Red, Louis Grognet, Mountain Rose, Royal George, Early Crawford, Belle of Georgia, Elberta, Red Shanghai, Kalamazoo, Finlayson's Seedling, Lady Palmerston, Osprey Improved, Salway Improved, Late Red Italian Cling.

— Cherries. —

Early Purple Guigne, Early Twyford, Knight's Early Black, Early Lyons, Burgdorff's Seedling Biggareau, Napoleon, Black Tartarian, St. Margaret.

— Apricots. —

Newcastle Early, Oullin's Early, Riverside, Royal, Telton, Moorpark, Robins' Imperial.

SELECTION BY MR. NOBELIUS.

PEACHES.

Sneed, Triumph, High's Early, Canada, Hale's Early, Royal George, Kia Ora, Shipley's Red, Peregrine, Champion, Surecrop, Pillar's Cling.

— Apricots. —

Sardinian, Oullin's Early Improved, Shipley, Alsace, Hemskirke, and Mansfield Seedling.

— Nectarines. —

Irrewarra, Early Rivers, Hunt's Tawny, Lee's Seedling, and Goldmine.

— Plums. —

Blue Rock, Angelina Burdett, Sugar Prune, Grand Duke, Monarch, Green Gage, Coe's Golden Drop, Jefferson, Diamond, and Emerald.

— Japanese Plums. —

Sharp's Early, Burbank, October Purple, Santa Rosa, Wickson, Combination.

— Pears. —

Jargonelle, Clapp's Favorite, Williams' Bon Chretien (syn Duchess). Conference, Mount Vernon, Beurre Bosc, Packham's Triumph, Bountiful, Josephine des Malines, Winter Cole, and Packham's Late.

— Dessert Apples. —

Irish Peach, Gravenstein, King David Foster, England's Glory, Senator, Delicious, Pomme de Neige, John Sharp and Cleopatra.

The attention of Orchardists and fruitgrowers is directed to an advertisement in this issue with reference to "Our Jack" Arsenate of Lead and Bordeaux Powders for spraying; also Soluble Red Oil for woolly aphis.

Fruit Garden

Gooseberry Cultivation.

At the Kareela branch of the Agricultural Bureau of New South Wales, Mr. N. B. Gibbons read an interesting paper on gooseberry cultivation.

Mr. Gibbons said:—The cultivation of gooseberries, from a commercial point of view, should receive more attention in this district than has been the case hitherto. The climatic conditions are very favourable, and though the land is not as good as might be wished for, yet it has been found to produce many kinds of excellent fruits, amongst which is the gooseberry.

For those about to try goosberry cultivation, I wish to point out that one of the first things to consider is the preparation of the land and choice of position. It is always best that the latter should be in a sheltered and moist piece of ground. The land should be thoroughly cleaned, and worked to a good depth before planting. This is necessary in order to give the roots an opportunity to get well down, and also to conserve the moisture.

The next thing to consider is the variety to plant. There are a number of good varieties, but there is only one best, and it rests entirely with the intending grower to decide which one that shall be. We ourselves have tried a number of varieties, and our experience has led us to decide in favour of the Roaring Lion. It is a strong, vigorous, and hardy bush, and a prolific bearer the berries are large, thin-skinned, and well suited for market. Our method is always to prune well back, and always to a top bud, in order to make the growth as upright as possible, thus keeping the bush well off the ground. The roots should be carefully pruned, and any buds showing amongst the roots that are likely to send up suckers should be cut or rubbed off. We have found that where the bushes will persist in sending their roots to the surface they never thrive well, as the ground gets too hot and dry during the summer months. It also makes cultivation more difficult. In planting in this district, 6 feet apart would be sufficient if it is intended to do the cultivating by hand, but if it is intended to work in between the bushes with a horse, then 7 feet would not be too much, or even 8 feet.

When planting it is advisable to mix a little bonedust with the soil. Care should always be taken not to let manure of any kind come in direct contact with the roots. No more manure is needed then until the third or fourth year, when the bushes begin to carry a fair quantity of berries. We then manure very lightly at first, and each year as the bushes get larger increase the quantity. The mixture I would recommend is made up as follows:—Half bonedust and half Shirley's No. 5, with 1¼ cwt. of sulphate of potash added to every 15 cwt. of this mixture.

This season we manured in this way a ¼-acre block of our eight-year-old bushes, giving them at the rate of 15 cwt. per acre. The block consisted of 262 bushes. Our returns were 220 cases, which would be equal to 880 cases per acre, or nearly 9 tons. This to my mind clearly shows that it pays to manure judiciously. It has often been said that artificial manures are quickly washed out of the soil. Our experience goes to show that this is not so.

A fairly good rainfall during the growing season is essential for success. Another point to remember is that where artificial manures are being continually used, the land should be well limed every four years.

— Cultivation. —

Our methods of working are to prune during June and July, manuring early in August. We do not lay the manure thick round the bushes, but spread it lightly over the entire space between the bushes, and then fork it well into the soil; then, until picking time, the surface is kept loose with the hoe.

When picking the fruit it is inadvisable to wait until the berries are full grown, but as soon as they are large enough to ensure getting top market price, we go over the whole of the bushes picking the largest ones only. In this manner the consignments are of uniform size, and the bushes, relieved of the largest berries, have an opportunity of quickly developing the smaller ones.

In marketing berries, the aim should be to make them as attractive

as possible when the cases are opened up. In order to do this, each case is neatly papered. Care must be taken that the berries are not hot when put in the cases, else they will wilt or become soft.

After the picking is done we go over the ground once more with the hoe to soften it, so that it will absorb as much of the rainfall as possible, and also keep the weeds in check, otherwise they would soon smother the bushes. They are then left till pruning time comes round again.

One of the advantages of the gooseberry culture is that the fruit comes in early, and there is always a good demand for it. Then again, no matter how bad the season may be, we can nearly always depend on having a crop of some sort.

Another distinct advantage is that on a very small area of land, one can have a quick and sure return whilst clearing other land, and waiting for fruit trees to come into bearing. The greatest trouble we have had to contend with has been the "white ants"; almost every season we lose some, and frequently the best of our bushes. We never know that they are there until the bush is completely ruined.

Fruit by Post.

The Postal Department of New Zealand acting in co-operation with the railway authorities, and shipping and carrying companies has completed a scheme whereby the consumer can obtain parcels of fruit direct from the producer at a minimum of cost. The regulations which have recently been published in the New Zealand "Departmental Journal of Agriculture," show that the method of ordering the fruit is not only very simple but provides means for conducting the business with as little friction as possible.

Individual fruitgrowers or Fruitgrowers' Associations who decide to work under the scheme, a list of their names and addresses being exhibited at every post office in the Dominion, will make known what fruits they can supply and the prices of the various sized packages delivered at any specified point.

All that the purchaser has to do is to go to his nearest post office and obtain a fruit order coupon, the charge for which will be 2d. These coupons are filled in with all the necessary particulars, and handed to a postal officer with the cash for remittance. The amount handed in must be sufficient to prepay the advertised price of the fruit and of transport and delivery charges, with a small commission on the postal notes necessary to make the remittance. Full instructions are delivered to the grower or his association by his nearest post office, and all that the purchaser has to do is to wait quietly for the delivery of his fruit, either by delivery, or by ship and carrier delivery, to his door.

Cross Pollination of the Jonathan.

Mr. P. J. Carmody, Chief Orchard Inspector, Victoria, in a recent report on the setting of the Jonathan crop in his State, mentions that this apple gave promise of a very heavy return where the trees are under the influence of other varieties blooming at the same time.

He mentions, however, that, where large areas of these apples are planted out on their own, crops are light and irregular. He has found that the Rokewood, Yates, and Statesman apples are among those having the greatest influence in interpollination with the Jonathan, and that it is remarkable to see young trees three and four years old with this advantage laden with fruit, whilst without it trees eight years old would have but a few apples on them.

A New Fruit.

A consignment of a new fruit from India was recently received at Covent Garden. It is called Jamra, and both in shape and size is like an ordinary pear, but is blood red in colour. Specimens were sold at one guinea each.

Fruit Pollination.

(From Bulletin published by Oregon U.S.A. University.)

Every practical orchardist has now come to realise, or if he has not, he should, that one of the most important phases of orcharding is the problem of pollination. It must be considered in selecting any variety for planting. The question has been one of scientific interest for many years, and, unfortunately, much has been written on this subject before definite information was at hand, with the result that many of the recommendations of to-day must be considered without foundation.

Too many times one is prone to consider that any lack in the setting of fruit is purely and wholly due to the absence of proper pollination. As a matter of fact, there are many causes other than pollination which must be taken into account. Among the first of these we may mention the inability of certain varieties to set fruit, or of certain spurs on the tree to mature fruit from the blossoms which occur on them in the spring. To drop their fruit seems to be as much a character of certain varieties as is the colour, flavour, or any other character of the variety. From carefully conducted experiments we must conclude that by no means is all the spring and summer drop to be attributed to lack of pollination.

Another one of the important causes of dropping of blossoms is the vegetative vigor of the trees. If a tree is growing too vigorously it frequently runs entirely to wood and scarcely produces any blossom, and the few that it may produce are usually shed very soon after the blooming period is past. The same may be said of trees which are in a very poor condition. While the latter may bloom more profusely than those which are growing vigorously, such blossoms are as incapable of setting fruit as are those on the former.

Insects and diseases also frequently cause the loss of many blooms. Some are destroyed outright by the various diseases such as scab, anthracnose, or blight, and in the case of peaches and plums, by the brown rot fungus. Many blossoms may be ruined when quite young by attacks of insects. Even some of the blossoms, which may be set are later killed by these same causes before they have made any considerable size and are frequently shed.

It is almost too well known to need mentioning that rain or hail during the blooming period is the cause of failure of many blossoms. This loss is due to the fact that much of the pollen is destroyed by rain and the stigmas of the blossoms are injured to such a degree that pollination and consequent fertilisation is impossible. Of course no fruit is produced under such conditions. In this connection, however, it may be well to mention the fact that usually all the blossoms do not come on at the same time, and enough may meet with favourable conditions to produce a fair crop.

— Weather Conditions. —

One of the most serious climatic conditions with which we must contend is frost. Injury from this cause is brought about in two ways; first, by winter freezes; and second, by spring frosts. In the former instance the fruit buds are either killed outright during the winter, or are injured only to the extent that they are incapable of producing fruit. That is, the flowers expand and without careful inspection appear normal, but on closer examination it is usually found that the pistils or heart of the very young fruit has been killed. Injury from late spring frosts is manifested in various ways. The young fruit is subject to injury from the time the fruit buds have opened until the time the fruit is as large as a garden pea or even later. If the frost is very severe the young fruit is generally killed outright, as is recognistd by a very noticeable blackening a few hours after the frost. In certain instances, generally after pollination has occurred, a light or medium frost does not entirely kill the blossom but seems to allow a certain degree of development. Usually in such instances the seeds are killed and there is little or no development of them, though there may be some. Usually such fruit develops somewhat abnormally, frequently producing in pears what is described as "bull-neck." Such fruit will usually hang on the trees up to the time they are ready to make the last swell before picking time, then they will drop in quantities. Often if not too badly injured they will develop sufficient size to be marketable.

Another cause of the shedding of some fruit, though probably in general of an inconsiderable quantity, is the spraying of trees when in full bloom. Careful experiments conducted along this line by several experimenters have demonstrated that when the trees were thoroughly sprayed before the blossoms had been pollinated they failed to set fruit. Usually, however, if two or three days have elapsed after pollination and before the spraying, such fruits will set perfectly. Furthermore, on most varieties the blossoms open at intervals for several days, and one spraying would not be likely to injure all the blossoms in any one cluster.

It will be seen from the foregoing, and as pointed out above, that we must take into consideration several factors other than pollination when we are looking for the cause of failure of blossoms to set. However, we think it is safe to say that all varieties of pome fruits, at least apples and pears, even though the varieties are termed self-fertile are benefited by having other varieties planted with them as pollenisers. One frequently meets with the term partially self-fertile, or partially self-sterile. By this is meant that under certain conditions a limited number of fruits will set. By far the greater number of our varieties must be classed in the self-fertile or partially sterile list, and as above pointed out, it is always best to plant two or more varieties together. However, we must guard against planting too many varieties. One variety as a polleniser for another will serve every purpose that twenty would. In the past one of the greatest difficulties has been that the orchardists have gone on the supposition that if a little is good, more will be better and some have planted all the way from fifteen to twenty varieties, many of them worthless, merely for the sake of securing cross pollination. This is a mistaken idea, and one that should be guarded against. Of course, if one wishes to grow a number of varieties for other reasons there can be no objection from a pollination standpoint, but otherwise, it is to be avoided.

— Secondhand Effects. —

The main point that must be taken into consideration in the study of the pollination problem is the so-called secondary effect of pollen. By this we mean the effect, let us say, of Spitzenburg pollen on a Newtown apple in the immediate cross. Much has been written for and against the use of certain pollenisers, and we believe that we must conclude that in general there is very little effect other than a change in size of the fruit, increase in percentage of set, and uniformity of crop. Flavour, quality, keeping quality and colour are probably not affected in the least.

This subject has been discussed from the earliest times, ever since the pollination problem has begun to be investigated, but from carefully conducted experiments the last several years we believe that we must conclude that if other noticeable effects are manifested they are exceptionally rare indeed. The same conclusions have been reached by other very careful workers along this line. Too much credence has been placed in sporadic instances of apparent effect. Thus, we frequently hear that if a Spitzenburg apple has a bright, yellow band from calyx to stem, it is considered to have been pollinated by a Newtown, or if a Ben Davis has a similarly placed dark red band, that it was pollinated by a Baldwin. These suppositions must be held to be false and the effect attributed rather to bud variation. We have met with many instances of this sort, and are forced to conclude that the pollen which was used had absolutely nothing to do with the colour. Soil, the methods of pruning, fertilisation; cultivation, irrigation, and other orchard

ractices will influence colour, quality tc., far more than will the pollen of neighbouring varieties. As had been mentioned, the three greatest factors influenced by pollination, are size, percentage of set, and uniformity. Certain varieties of pollen may possibly produce, when applied to any given variety, a smaller fruit than normal, and certain other varieties may produce a larger fruit than normal. One of the points that should be emphasised in this consideration is that cross-fertilised fruits generally produce more seeds than do those which are self-fertilised, and furthermore, the greater the number of seeds usually the greater the size and weight of the fruit itself. In fact, seed production seems to be the exciting cause of the growth of the flesh of the fruit. Often in self-fertilised fruits while the fruit will come to full maturity, it is not more than a fifth or quarter of the size of a cross-fertilised fruit, and is generally seedless.

It may be well also to call attention to the fact that pears will not serve to pollinate apples, nor will apples pollinate pears, though the various species of apples will inter-pollinate, and the same holds true for pears. Cherries, plums, or peaches also cannot be considered in any way to serve as pollenisers for either apples or pears of any variety.

— Essential Factors. —

The question then arises what are the essentials of a good polleniser. First of all, we may say that the two varieties must bloom at the same time. That fact is self-evident, for if one variety is out of bloom before the other begins it may as well not be there so far as furnishing pollen is concerned. That is to say, the pollen of one must be acceptable to the pistils of the other; and such as is going to give the best and most uniform fruits and greatest percentage of set. Third, both must be good pollen producers. If a shy pollen bearer is planted with an abundant pollen bearer, the variety which produces little pollen will, of course, be greatly benefited, but there will be little reciprocal action, as is readily seen. Such an example would be the planting of the Winesap and Rome Beauty. The Winesap produces very little pollen, whereas the Rome Beauty produces plenty. The former, therefore, would have an abundance of cross-pollen to fall back on, but the Rome cBauty would stand slight chance of being crossed by the Winesap. Fourth, both varieties preferably should be commercial This is simply, of course, a practical point in economics. Fifth, both varities should come into flower at about the same age. For example, were the idea to pollinate the Wagner with Northern Spy, the result would be that for several years the Wagner would be without a polleniser, in that it comes into bearing much earlier than the Northern Spy. Such a discrepancy can be made up in a measure by the use as fillers, of dwarf trees of the late bearing variety. Such dwarfs will bear several years in advance of the standard and later can be readily removed.

— The Importance of Bees. —

Careful experimentation has shown that very little, if any, pollen of our tree fruits other than nut trees, is transported by the wind. Probably 99 per cent. or more of the transfer of pollen is done by insects. Prime among these may be mentioned the honey bee. Bumble bees, ants, flies: moths, and short-tongued bees play an important part. However, there is no doubt but that the common hive bee is by far the best of all, and it will pay every orchardist to have a few stands among his trees.

In putting out an orchard the system recommended to secure the best results from pollination is to plant four rows of each variety, be there two or more. Such an arrangement would allow for convenient harvesting, pruning, etc., and serves better than planting four and one, which is sometimes recommended. Of course so far as pollination is concerned the latter arrangement is entirely permissible if one wishes to grow a larger proportion of one variety than an-another, but in general if one can have the varieties blocked more or less many of the orchard operations will be simplified. For, as is well known, the several varieties frequently require quite different attention To illustrate, if the Bartlett were used to pollinate d'Anjou pears, and the same were planted four rows of d'Anjou to one of Bartlett, it is readily seen that the Bartletts must be harvested earlier than the d'Anjou, with the result that there would be considerable tramping and hauling through the latter, thus not only compacting the ground unnecessarily, but also incurring the risk of knocking off fruit, disturbing props, etc. Many similar instances could be cited.

Prune-Growing

(By W. J. Allen in the "Agricultural Gazette" of New South Wales.)

The prune industry is now beginning to engage attention in this State, and there is a growing demand for the product (dried and green), which promises well for the industry. Prunes are a paying crop, and many parts of this State are well adapted for growing them. From 150 trees at Bathurst orchard 3 tons 1 cwt. of dried fruit were obtained last year, and when disposed of in the open market an average price of 8d. per lb. was obtained, or a total amount of over £225. The trees were 15 years old, and there was nothing exceptional in their conditions, which makes it all the stranger that this State should be importing largely, at a high price, a fruit that we can produce equally as well here at a good profit.

— Climate. —

The principal conditions to be desired for the production of a bright prune are moisture and sunshine, which give an earlier and more perfectly ripened fruit. In this respect districts such as Wagga, Young, Albury, Koorawatha and Parkes commend themselves. A district that is coming to the front in prune production is Batlow, and I have inspected and sampled some very fine quality prunes from the orchards in that district. During dry seasons, where irrigation is not practised, prunes often drop heavily before being fully developed, and those which remain are small and of inferior quality.

— Soil. —

Prunes thrive best in loamy soil, which contains a high percentage of lime and potash. The prune-tree is a gross feeder, its limbs growing oftentimes several feet in the one season, so whatever the soil it must be good, and it must also be well drained.

— Subsoiling. —

It is considered that our heavier soils, or those with a clayey subsoil, are improved by subsoiling, as it loosens them up and puts them in almost as perfect condition as possible for the reception of the young fruit trees. Such a soil will conserve and retain more moisture than a hard soil; it also warms up better and allows the roots of the young trees to reach out and downwards. Young trees planted on such land will make a good growth and furnish into strong trees sooner than those planted on land not so treated.

— Planting Trees. —

When planting the trees care should be exercised, as, unlike a farm crop, the trees are to stand for many years, and the proper treatment in the early stages is a great aid to future success. The following particulars will be found important in all planting, and should be given due attention.

The tree should be set a little deeper in the soil than it stood in the nursery row, the roots must not be long uncovered, and any bruised ones should be shortened back to healthy wood. Every care must be taken to get the tree into its natural environment as quickly as possible.

The soil should be firmed well about the roots of the trees, which should be laid out in approximately their natural position, the hole being large and roomy.

— Stocks for the Prune. —

The prune may be propagated i[n] many ways, either by suckers taken from around the trunks of old trees, or by budding or grafting. Suckers are not generally used, as their habit of again sending up suckers condemns their use. The stocks best suited for the prune in this State are the Myrobalan and Marianna plum. Peach stock is sometimes used on sandy soils, the prune making a good union with it.

The Myrobalan plum is propagated from either cuttings or pits, the latter being preferable, as a seedling generally makes the best root system. The Myrobalan never suckers, and it will thrive in a wetter and colder soil than most other stock for stone fruit.

The Marianna grows very well from cuttings, and is particularly suited for sandy soils. We have found at the Government orchard at Wagga that Robe de Sergeant is doing better when worked on Prune d'Agen that has already been worked on the Myrobalan than when it is worked on the Myrobalan direct.

— Distance Apart. —

It is an almost universal fault to plant trees too close together. Successful growers have found this out after years of experience. Trees are gross feeders, and necessarily require

plenty of room and moisture. Having the trees planted widely apart allows of a greater area for the conservation of moisture in the drier districts, and provides better working conditions; cultivation is more easily carried out, spraying may be more thoroughly done, and above all it will give a well-formed, strong tree. The prune-tree should be planted from 22 to 24 feet apart.

— Pruning. —

To prune intelligently, the habit of growth of the tree, whether upright, spreading, or close-growing, should be studied. In fact, in practice it is necessary to give every variety of fruit somewhat different treatment. For all practical purposes a tree embodying the following should give satisfactory results:—A medium, low roundish, symmetrical top, upon which the fruit may be easily thinned and picked, easily sprayed, and upon which there are strong branches that will not break with a load of fruit and which will shelter the stem from the sun.

— Cultivation. —

There can be no doubt of the great benefit to be derived from thorough cultivation. To no fruit does this apply more forcibly than the prune. The fruit and tree being such heavy feeders, require every available ounce of plant food. Cultivation should begin as early in the spring as possible. Early cultivation is important since it warms up the soil, gets it in good mechanical condition, and kills the young weeds. This should be continued frequently thereafter until about March or April in the drier climates, or according to the season and the young growth which the trees have made.

Every orchard is so greatly influenced by special soil and conditions that it is hard to lay down any hard-and-fast rules as to the best treatment for every case; just what proper cultivation is must be determined by every grower for every orchard and every season.

In young orchards it is advisable to plough the land thoroughly early every spring. The later cultivation may be carried out with the cultivator, which with a minimum expenditure of time and labour will destroy weeds and keep the surface soil loose and friable. There are such a number of good implements that there need be no trouble in finding one suitable for any purpose.

Spring-tooth cultivators, and set-tooth cultivators, disc harrows, and smoothing harrows all have their places. The spring-tooth cultivator finds great favour in the orchards throughout this State. The frequency with which we should cultivate depends upon the soil, season, and purpose. In the warmer districts, cultivating once a fortnight may not be too often when it is aimed at conserving moisture. A hard crust should never be allowed to form or weeds to become established. The cultivator should endeavour to leave the soil soft and fine, so as to retain as much moisture as possible. The soil should be worked close up to the trees, and the latter need not be pruned high to accomplish this.

— Green Manuring. —

This question is now beginning to engage attention, and there seems to be every reason for this interest. That thorough cultivation during the summer months, followed by the sowing down of a suitable crop to grow during the winter whilst the tree is practically at rest gives good results, is evidenced by the strong and healthy growth of orchards where this practice is carried out. One merit of such a procedure is that the unsightly crop of weeds, which often springs up after the summer's cultivation, is destroyed. This is no doubt beneficial and would assist in the future working of the orchard, as the old saying is that "one year's seeding is seven years' weeding." Further than this, it is generally considered that the mechanical condition of the soil is improved since it does not dry out so quickly in the spring, and it adds very greatly to the vegetable matter (or humus) in the soil. Crops that are giving good results when used for green manuring are barley, rye, vetches, peas, and cowpeas.

— Thinning the Fruit. —

This practice is a good one where fruit sets at all heavily, as there can be no doubt that better prices are realised for fruit that is of good quality combined with size. The quantity of fruit in bushels will be as great, if not greater, on the thinned as on the unthinned tree, and you have for the extra work of thinning a handsome and much more valuable product. With trees that have had their fruit thinned, there are of course many less pits, and large fruit, mostly with a watery flesh. For the formation of the excessive number of pits in the fruits on unthinned trees, it requires a much greater quantity of the mineral elements of the soil, and since these are the elements most apt to be wanting and most difficult to obtain, it is obvious that the growth of a tree, overloaded with fruit, is checked, its vitality weakened, and in the end productiveness lessened.

No set rule can be laid down for thinning. The quantity of the fruit removed must vary with the size and vigour of the tree, the variety and the way in which the tree has been pruned.

The work is much facilitated if the tree has been well pruned, since pruning in itself reduces the number of

fruits to be removed, and makes it easier to get at the fruit on the tree.

— Varieties. —

In the warmer districts of this State the Prune d'Agen and Robe de Sergeant have proved most suitable. At Batlow the Silver Sugar and Golden are doing particularly well.

Prune d'Agen.—The following description of the Prune d'Agen and other prunes as grown in California, as well as other information on culture and curing, is condensed from the reports of the Board of Horticulture of the State of California, and from Professor E. J. Wickson's work on Californian fruits:—"Branches of medium strength, bent at their very short intermodes, deep brown on the shady side, whitish on the sunny, smooth; wood buds, small, conical, not very sharp; fruit buds, medium size, ovoid, not very sharp; leaves, medium size, oval, elliptic or obovate, with a deeply-crenated edge; petioles of middling length and strength, wine-coloured, and slightly downy; general hue of the foliage, a light green, stiffness of all the leaves; petioles of the leaves well spread out and diverging, are the striking characteristics of the tree. Fruit, medium size, ovoid or egg-shaped, more tapering on the side of the stock than on the side of the piltillary point, around which it is very obtuse; a very deep suture on one side, with a scarcely perceptible furrow on the other; skin, thick and firm, parting from the flesh, at first of a light purple, tinged with green; at maturity the purple becomes very dark, and covered with a thick, bluish bloom; fruit stalk somewhat long and slender, inserted in a narrow and shallow cavity; flesh yellow, very sweet, rich, and sugary; pit small, ellipsoid, flattened, and most often separating from the flesh."

Prune d'Agen.—Following description of Prune d'Agen, or Robe de Sergeant, or Prune d'Ente, as grown in France, taken from the French Dictionary of Agriculture, is by J. A. Barral:—"Tree very prolific; fruit oblong, swollen towards the middle, violet rose colour, a little spotted with very small dots, white or black; flesh yellow, sweet, with a strong perfume developed by drying; the pit is oval, oblate, obtuse, adhering to the flesh by some points on the side."

Robe de Sergeant.—Robe de Sergeant is considered in France as a synonym of the Prune d'Ente or Prune d'Agen, as it is also by Downing, but in California and in New South Wales it is considered a distinct variety. The Californian description is as follows:—"Fruit medium size, oval, skin deep purple, approaching to black, and covered with a thick blue bloom, flesh greenish, yellow, sweet, and well-flavoured, sugary rich and delicious, slightly adhering to the stone; a valuable drying and preserving variety. The tree is quite an upright grower, and has a much broader leaf than the Prune d'Agen. A peculiarity of this prune is that it cannot be worked on any other than plum stock except by double working. When worked on peach or almond it sooner or later severs from the stock." We have found at the Government orchard at Wagga that this variety does better when top-worked on another variety of plum that has already been worked on the Myrobalan.

Silver Prune.—Originated in Oregon, U.S.A. Probably a seedling of Coe's Golden Drop, which it closely resembles, but is a better bearer. It is a first-class drying plum owing to its firm flesh, large size, and fine flavour. Fruit large, oval; a little necked, one side larger than the other, skin light yellow, marked with numerous dark-red dots on the sunny side. Flesh yellow, firm, adhering to the pit, sweet and fine flavour. Tree a rapid grower, but does not bear as young as other varieties.

German Prune.—This prune is grown under a large number of names, and is probably the variety most extensively planted in Germany and all Central Europe. The following description and drawing are taken from "Downing":—"Fruit long oval, nearly 2 inches long, peculiarly swollen on one side and drawn out towards the stalk. Suture distinctly marked, skin purple, with a thick blue bloom, stalk three-fourths of an inch long, slender, slightly inserted; flesh firm, green sweet, and pleasant; separates easily from the stone, which is flat, very long, and a little curved." In the east of France this prune is largely used for distilling purposes.

In addition to the prunes of which I have given a description, there are several other varieties of more or less merit, such as the Bulgarian, Brignole, Hungarian, or Pond's Seedling, or erroneously Gros Prune d'Agen Tragedy, Fellenburg, or Italian, Wangenheim, St. Martins, Hungarian, Date, and several of the d'Ente type. Space will not permit me to give a detailed description of these varieties nor do I think it necessary to do so in an article of this description, as if prune growing is to be made a success in this colony it will be advisable to stick to one or two varieties, so as to be able to produce a class of fruit that will make a name for itself in the markets of the world as the Californian prune has done.

The prune most extensively grown in California and in the district of France that produces the finest prunes of commerce, viz., the Department of Lot-et-Garonne and neighbouring districts, the fruit of which is shipped from Bordeaux, is the Prune d'Agen, or, as it is often called the Prune d'Ente.

ndour.—This variety is productive, firm, rich, sugary, early, and twice the size of the French prune; freestone.

Sugar.—This fruit is even in size and very large; early, yellow flesh, and rich in sugar.

Fellenburg or Italian Prune.—Fruit medium to large size, long, oval; skin dark purple; flesh rich yellow; clingstone; rather a light cropper.

Golden Prune.—A prune closely resembling Coe's Golden Drop, being, however, a little more rounded, with slightly different colour and flavour The dried product is of fair quality.

In our Departmental orchards the Prune d'Agen (which when worked twice is found to be a more regular cropper) and Robe de Sergeant have proved the two best varieties for drying purposes. There are one or two other varieties which make a good commercial article in such districts as Batlow and similar localities, but the above-mentioned are the varieties most largely planted, as they are in every respect suitable for the purpose. In the warmer climates the Robe de Sergeant carries a better crop than the Prune d'Agen. The fruit hangs better during dry seasons and ripens earlier, and has the additional advantage of being suitable for both dessert and cooking purposes.

In the coler districts, such as Bathurst, both kinds do well, while at the Kameruka orchard, near Bega, the manager tells me that the Prune d' Agen is superior to the Robe de Sergeant. It will therefore be seen that it is as well to make some inquiry in order to ascertain which variety is doing best before planting out an orchard.

Bananas at Fulham.

The growing of bananas, though not a commercial possibility in South Australia; at least, as far as the Southern portions are concerned, is quite possible under certain favourable conditions. Mr. F. J. Mellor, who devotes a good deal of time to growing unusual and interesting plants, has successfully ripened some very fine fruit this season. The bananas are said to be exceptionally fine in size and flavour.

The Farm

Poisoned Pollard.

A West Coast farmer, writing some time ago to one of the daily papers with reference to sheep having been poisoned with phosphozised pollard where laid for rabbits, also as to this preparation being the cause of fires, made the following useful suggestion :—

1. If the poison pollard is laid with care with a proper poison cart with bait coverer there is no danger of poisoning stock, provided the poison is not laid on a steep incline where the water would rush down the furrow from any chance storm of rain, and wash the baits into any grass that might be in the hollows below. This may happen for months after the poison is laid. The pollard not taken by the rabbits will dry in a hard lump, and lie for an indefinite time. 2. The pollard should never be laid on rough, stony ground. The jolting of the plough on the stones causes the baits to drop indiscriminately either in or out of the furrow. 3. I find the best way is to run the plough round the large burrows, and form a ring of baits round them. 4. If the prepared phosphorus is used (various brands) I don't think there is any danger of fires; but with the raw phosphorus and bisulphate carbon or phosphorus and boiling water there is. I have used both, and on several occasions have had the baits take fire spontaneously. I have never had any trouble when using the prepared poisons. I have been poisoning rabbits for several years, and in that time have used three different kinds of poison—strychnine, arsenic, and phosphorus. The only one I had any success with was the phosphorus when laid as baits. In dry country a lot of good can be done by using poisoned water at the stock watering places. With this either strychnine or arsenic can be used with good effect. I have always had the best success with arsenic. Rabbits drink the water more readily. This is no use in marshy, swampy country. Plough and pollard is the best there.

Oats and Sheep Fattening.

It is not possible to depend on any one product to ensure profitable cultivation of the soil. There must be variety but the ultimate, as well as the immediate, action to secure this must be considered. A certain description of crop may be made to prepare the land for the following crop, so that the course of cropping cannot fail to be of advantage to the cultivator, writes a Victorian farmer to "The Leader." It is well known what lamb rearing in combination with freezing has done for New Zealand, and there is no reason why we should be any degree behind. The cash returns are quick, and in our warm and genial climate we have advantages over New Zealand while that country has in turn other advantages over us.

We cannot, as in New Zealand, in our northern districts, depend upon root crops, but late seasons have taught us that sheep will do well upon oats, even on those farms where not a vestige of grass was to be seen. Various forms of artificial feeding have been tried—hay, chaff and oats—but there is no comparison between the first of these and the latter. Half a pound of oats per day will maintain a sheep in good condition, and 1lb. will fatten any healthy store. I have seen it proved that 2 bushels of oats will fatten a sheep for the market. A farmer should not thrash his oats unless he sees 2/6 per bushel for them in the stack. By feeding sheep he is assured of this, and for topping up lambs more.

Litters.

Supposing that you have an early litter in view, be sure and have everything ready. Firstly, there is the sty. Put in an hour or two on this. Give it, roof, sides and all, a thorough brush down—cobwebs, dusts and insects will thus have a compulsory shift. Then have a good look at the floor. There are so many kinds of floors. Bricks, set at a fairly sharp incline on a strong bed of concrete are a good, if not the best floor. For fattening pigs nothing more than the bricks are needed. But when the sties are required for sows, have stages made of 2in. by 1in strips of deal nailed down on supporting battens cut at an angle to countecact the slope of the floor. The strips are nailed at an eighth of an inch apart. These stages can be made in sections, being easy to lift up and down.

Before putting the stages down, have the floor carefully examined. If there is a sunk brick, or one that holds moisture, have this taken up and relaid in cement, a bag of which no farmer should be without, as this and half a ton of sand will save many woes and worries.

If there is any evidence of rats, pour a little gas tar down the holes, then plug the holes with liquid cement and crushed glass, not big pieces, as rats will work round these, but nice splinters of the kind that no matter which

way you handle them they will either perforate or cut. Rats cannot face these.

Having made the inside secure, go outside and just give a dab or two of tar to the corners of the piggery, or where rats usually run on the exterior. Then tar the exit of the drain or drains, as rats fairly detest gas tar. They will not avoid Stockholm tar or pitch to the same extent.

It may be asked: Why take all this precaution against rats? The reason is that rats, with short supplies, will become very aggressive and even cannibalistic. The smell of blood seems to bring out their very worst instincts, and many a farmer could tell of leaving ten little sucklings beside their dam at night, and finding only nine in the morning; perhaps to see the litter reduced to eight a couple of nights later. Then when the floor of the piggery has been torn up, the partially eaten and mangled remains are found beneath. Therefore, make provision against rats.

— Rails. —

The floor and stage having been got ready, it will be well to put three bars around three sides of it, standing about a foot to fourteen inches high, and about a similar distance from the walls. Make this firm—quite rigid in fact—and capable of sustaining a considerable weight and strain, as when the sow plumps down, it is apt to give away. Care must be taken not to put chunks of wood under the rail, as these block the run for the young pigs, and sometimes allow of their being badly squeezed if not actually pinned and overlaid Therefore, the use of strong iron brackets or supporting stays is very essential.

The sty being got ready, run a few bundles of straw through the chaff cutter. Put this so as to have it ready to hand.

Now, it is well to make friends, so to speak, with the sow. Whilst feeding her, rub her ears and rub her back. She soon appreciates this, and will not be afraid or vicious. When the event is expected, have a final look round and put up a rod or wire to hang the lantern on, so that it can be shifted right across the sty, as it is quite impossible to tell where it will be required. When the sow becomes uneasy, throw her in a bundle of straw, giving her some occupation in "making" her bed, as not until she has practically reduced this to pulp will she think of settling down.

— The Young Pigs. —

When the young pigs begin to arrive, it is well for someone to be present, and take care of them by putting them up to the teats.

It is an excellent practice to provide oneself with a rather small elongated pair of closefitting flat nippers, and immediately nip off the small needle-like teeth of the small pigs. It is a painless operation, and will save the dam a lot of pain and worry later on. When the last arrival has appeared on the scene, and the cleansing has come away, prepare a nice warm half-bucket of well-scalded broad leaf bran, and to this add a quarter of a pound of fresh lard or other fat not containing salt. Whilst the sow is consuming this, rapidly sweep the soiled bedding off the stage, and replace it with straw chaff. The young pigs cannot become entangled in this as they would with long straw, and it can be readily swept away.

It is very essential that the bed be swept back each morning, as with young pigs it soon becomes damp. The small openings between the pieces of wood now play their part by acting as drainage, but it is quite necessary to see that these do not become blocked. Therefore, run the pike prong along them occasionally to keep them free. A dry bed is one of the great essentials to the well-being of young winter pigs.

It is very essential that they should have warmth. See, therefore, that there are no draughts, as air is generally moving close to the floor. It will be well to put something at the bottom of the doors to check draughts beneath, yet ventilation is essential.

About twenty-four hours after the farrowing, a short walk generally brings about the desired opening of both passages. On the third day a dose of flowers of sulphur —a dessert spoonful—may be given in her food for three days, and then dropped.—Rural World.

Cement for Farm Building.

The high prices of timber and brick are bringing cement into use as a valuable and durable building material. In constructing milking sheds, stables, pig styes, and poultry houses cement is proving especially valuable. Where small rough stone and plenty of sharp sand can be had at cost of cartage or little more, the cost compares favorably with wood. With one good man to superintend the laying, the balance of the labor can be done by any ordinary labourer. Even rough stone needs very little facing in a wall, providing a good general line is followed.

The best grades of portland cement are the best and the cheapest. The quantity to be used for the foundation for walls and floors need not exceed, by bulk, one part cement to ten parts sharp, coarse gravel. The chief care should be to lay a good surface about 1 inch thick for floors. This surface can be made of one part cement to five parts sharp sand. Cement floors have the advantage of being easily cleaned, free from hiding places for rats or other vermin, and when properly laid, prove very durable. Pigs are destructive to wood work and cement should be used wherever the animals can reach the sides or bottoms of the pens.

Scrub brushes are the best articles for use in cleaning dairy utensils. Coarse linen cloths may also be used, but they require more care in keeping them clean.

Dry cows should be fed so as not to take on much flesh. Keep them in moderate condition and they will yield better.

Cow Testing.

We have frequently refered to the vital importance of cow testing. The following extracts from a report by the Nebraska Agricultural Experiment Station of the results of a local cow testing association is yet another and very emphatic advertisement, of its value.

The farmers of Nebraska are at present milking in the neighborhood of 700,000 cows, which produce on an averabe 125 pounds of butter-fat per year. The fact that the productive capacity of the average Nebraska cow is so low necessarily means that there must be many cows in the state yielding not to exceed 80 to 100 pounds of butter-fat per cow.

The Holstein cow Roxanna, owned by the University of Nebraska, has a record of 757 pounds of butter-fat; the little Jersey Jacoba Irene, once owned by one of our Nebraska dairymen, produced 952 pounds; while the wonderful Guernsey heifer Dolly Dimple of Massachusetts has 906 pounds of butter-fat marked to her credit when only three years old. It is hard to realize that some Nebraska farmers are working away with cows producing only 80 to 100 pounds of butter-fat per year, while others, because they paid attention to some of the details, have cows producing four or five times this amount. There is no question but that at least 200,000 cows in Nebraska today are not paying for their keep and that the profit of the other 500,000 can be greatly increased, if not doubled, by proper methods of feeding and management. There is hardly a question but that the production per cow can be increased from an average annual production of 125 pounds to 250 pounds of butter-fat per year, thus adding millions of dollars to the income of the cow owners of our state.

Now if such remarkable results can be accomplished by work of this kind, it seems hard to understand just why so many farmers have been slow to adopt a system of keeping records and testing the milk sufficiently often to enable them to discover and weed out of their herds the cow that generally consumes about as much feed as any cow in the herd, but produces only enough butter-fat to pay for a fraction of the feed consumed. It is not necessary, nor even desirable, that the farmer should replace all of his grade cows with high-priced, pure-bred Holsteins, Jerseys, Guernseys, or Ayrshires. However, for successful and profitable dairying it is absolutely necessary that he realize the remarkable difference in productive capacity of the individual cows in the same herd, though these cows are cared for by the same man and are consuming practically the same amount of feed.

The good cow judge can generally tell the difference between cows of high and low productive capacity, but very few judges, if any, can always tell by type or conformation the cow producing 300 pounds of butter-fat from the one producing only 200 pounds. As a matter of fact, the only accurate way of discovering the unprofitable and useless cow is with the scale and Babcock test. The truth-

fulness of this statement has been brought out in many instances. The former owner of Jacoba Irene, keeping no records of her production, considered her only an ordinary cow. Her worth was only determined after her owner took steps to have her tested. These figures revealed the remarkable fact that in less than a year she produced 1,111 pounds of butter, or more butter than is being produced by seven average Nebraska cows.

— The Association. —

Just west of Omaha, in Douglas county, is located a very prosperous, progressive farming community. Here the price of farm land is already in the neighborhood of 200.00 dollars per acre. In this locality and in this connection it is of interest to note that even the farmer, who years ago could not be forced into dairying, has now taken to it and is getting very satisfactory results. These farmers fully realised the importance of keeping accurate records of the amount of milk and fat produced by each cow in the herd. They also realized that through a co-operative cow-testing association the expense of obtaining these records would be very materially reduced.

The members of this Association entered 21 herds comprising some 435 cows. The work of the tester consisted in keeping accurate records of the amount of milk and butter-fat produced by every cow in the various herds, and also in making careful estimates of the feed consumed by these cows. To do so he had to spend one day each month with every herd belonging to the Association. In addition to this work this man was ever ready with suggestions as to how the rations could be improved for economical milk and butter-fat production.

A comparison has been made of one of the best and one of the poorest cows in each herd. These cows are all mature and were in the test for the full year.

It is to be regretted that lack of space prevents the publication of a complete detailed record of each cow in every herd. This not being possible it was decided to publish a complete record of the best and poorest cow in each herd in the test for a full year. The tables indicate the difference in the amount of milk and butter-fat produced, as well as the difference, if any, in the cost of feed consumed. One interesting thing brought out by these tables is the remakable difference in the cash returns from each cow for each dollar's worth of feed consumed. For instance, we find cow No. 36 gave 4.17 dollars worth of product for every dollar's worth of feed consumed, while we also find that a cow only 55 cents for every dollar's worth of feed consumed.

(This butter-fat was sold in the form of sweet milk on the Omaha market, hence the high average price given. It will, of course, be understood that this price is higher than would obtain where milk is not so well cared for and when sold in the form of cream for butter purposes. While this price is given for the value of butter-fat, it is really intended to represent the value, not only of butter-fat, but also of the skim milk portion of the producer. This price is possibly not too high when consideration is given to the fact that these farmers were naturally put to a heavier expense by better and more expensive methods of cooling and handling, and the extra expense of delivering every day.)

— Importance of a long Lactation Period. —

To illustrate the importance of a long lactation period a table of peculiar interest is presented — Thus the cow named Whitie milked five months longer and gave 73.76 more profit than the cow named Flossie. Both cows freshened at practically the same time and at first made a very similar showing.

It is a well-recognized fact that beef cows or even dual purpose cows will produre a fair quantity and quality of milk for some time after freshening. The fact that these very cows generally go dry after having milked from three to six months has frequently been lost sight of by many dairymen. This brings to mind the tester's experience while working with one of the herds. One of the men called his attention to that fact that his Shorthorn cows apparently were making as good a record as the average herd of the pronounced dairy type. At the time, the tester admitted that such was the case. However, a few months later practically every cow in this herd had dried up, while most of the cows of good dairy breeding were still in very good flow of milk. Too often the farmer forgets to make a comparison at this time. It might be said in this connection that after the tester's records began to show the remarkable results due to difference in length of lactation period, some herds were withdrawn, largely because the fact that they would make a poor showing was soon well understood by their owners.

Table—Showing the average production per cow in test for 12 months, of the various herds tested—

Herd No.	Number of cows.	Average pounds of milk per cow.	Average pounds of fat per cow.
1	25	10,029	218.6
2	21	7,962	313.5
3	8	8,350	272.0
4	7	6,980	266.9
5	10	7,845	265.7
6	5	7,012	260f8
7	5	7,128	242.1
8	24	6,995	240.2
9	17	6,001	239.5
10	26	6,552	229.7
11	11	6,168	228.0
12	12	6,156	224.4
13	12	5,334	205.5
14	5	5,305	199.4
15	8	4,424	174.0

Table—Showing the profit from the ten most profitable and the ten least unprofitable ones—

Most Profitable.	Dollars.	Least Profitable.	Dollars.
1	123.58	1	13.73
2	116.96	2	1.62
3	108.74	3	2.84
4	108.10	4	3.85
5	104.15	5	7.10
6	96.66	6	9.09
7	95.59	7	10.27
8	94.97	8	11.14
9	92.11	9	12.07
10	92.02	10	13.57
Total	1,032.88	Total	57.82

No. 1 of the least profitable cows showed a loss of 13 dollars, the remainder a slowly increasing profit.

From this table the reader will notice that a herd composed of ten of the best cows would yield a profit of over 1,000.00 dollars. Compare with this the meagre profit of only 57.00 dollars that would come to the dairyman as a result of a year's work with a herd composed of ten of the poorest coUs, and there is at least one evident reason why the farmer who keeps no record of the amount of milk produced and who thinks it of no importance to test the milk for butter-fat fails to make dairying profitable.

Because it was so apparent that they were not profitable, between eighty and one hundred of the

Continued on page 556.

Growings Onions.

The onion crop is one of which the cultivation may be regarded as quite a special branch of farming, because (1) it can only be grown successfully on certain soils of a specially favourable physical character; (2) it is so liable to disease, that quite special study and skill are necessary to enable the grower to successfully combat the attacks of the numerous insect and fungoid pests which always appear sooner or later on land devoted to onion culture; (3) in respect of labour onions might almost be classed as a market garden crop rather than a field crop, and for this reason the onion grower, in selecting his land, must not omit to consider the supply of labour available in the district. All these factors combine to confine the cultivation of the crop to certain specially-favoured localities, and also combine to limit the number of growers to a relatively small number of men who have the requisite knowledge and experience. For onions, ample supplies of all the essential manurial ingredients, combined with extreme fineness of tilth, are essential, and those conditions the grower aims to produce by suitable cultivation, and where necessary, by the addition of fertilisers to worn-out lands. So great was the inherent fertility of the onion-growing lands in the south-western district of Victoria that they continued to give heavy yields of this most exhausting crop for many years without manure, but the very richest soil may in the end bechme exhausted, and now almost all the onion-growers use artificial fertilisers in very large quantities.

In this respect, the

— Requirements of the Crop —

have been carefunlly investigated by some of the most up-to-date growers, and the evidence accumulated during the past few years goes to show that even on the richest land the onion crop repays heavy applications of complete manure. On unmanured land the crop makes a smaller growth of leaf, continues less vigorous, and is of a less healthy colour than on similar land alongside, which has been suitably fertilised. Further, not only is the total crop from unmanured ground invariably less than from manured land, but also the onions are smaller in size and less dense in texture. In this respect the writer has several times examined bulbs from unmanured and manured land, and, while those raised on the latter have been invariably hard and quite firm to the touch, the others, produced without manure, have been more or less soft and yielding. One of the most important effects of manuring is the date at which the crop ripens. An onion paddock suitably manured will be found to ripen, and the leaves to die down, from a fortnight to three weeks earlier than a paddock which as not been fertilised. This, it need hardly be pointed out, is of immense importance in marketing, very often making a difference of £2 to £3 per ton in the value of the crop.

The following results of an experiment carried out by Mr. J. A. Cochrane, the well-known onion grower of Geelong, Victoria, must be of great interest and value to others engaged in the cultivation of this crop :—

Plot No. 1—No manure, yielded 6 tons 5 cwt. per acre.

Plot No. 2—6 cwt. supherphosphate, 1½ cwt. sulphate of ammonia, yielded 7 tons 19 cwt. per acre.

Plot No. 3—6 cwt. supherphosphate, 1½ cwt. sulphate of ammonia, 2 cwt. muriate of potash, yielded 9 tons 15 cwt. per acre.

It will be observed that the unmanured land yielded 6 tons 5 cwts. of onions per acre. Similar ground alongside, manured with 6 cwts. superphosphate and 1½ cwt. of sulphate of ammonia returned 7 tons 19 cwt., an increase of 34 cwt. of marketable bulbs. The plot manured with 2 cwt. muriate of potash in addition to the other elements mentioned yielded 9 tons 15 cwt., a further increase of 36 cwt. for the 2 cwt. of muriate of potash. This plot was, it will be seen, the most profitable, giving a monetary return of £5 16/- per acre more than plot 2. It may be stated that the onion is, like the potato, a potash-demanding plant, and that the reason why this ingredient is so effective in increasing the yield and improving the quality is because of its effect in facilitating the transport of carbo-hydrates from the leaf to the bulb.—From pamphlet issued by The Agricultural Offices of The Potash Syndicate.

Great thoughts, reduced to practice, become great acts.—Hazlitt.

Paspalum Dilatatum.

This is a perennial grass, very hardy in so far as heat is concerned, but liable to injury by severe frost. The grass is a native of the southern States of America, and was brought thence to Australia, with the result, like many another plant and many another animal, that it has benefited by transportation, and improved much in size. In the Richmond River district of New South Wales paspalum has proved to be good for dairying and fattening purposes. It grows vigorously during the summer, and makes a splendid winter sward, is succulent from stem to head, and makes excellent hay, yielding enormous crops. Cattle eat every particle of it, sheep thrive on it, and it stands any amount of grazing. It spreads rapidly when once established and allowed to seed, but makes poor headway from roots. It possesses the merit of being a deep-rooter, and in consequence has as good drought-resisting qualities as the much-maligned stinkwort. Frosts of any ordinary type will not kill nor floods injure this grass. Great care is needed, in sowing, to make certain that none but ripe and fertile seeds are used. From six to ten pounds per acre is the allowance for the first sowing, if possible on burnt ground after fire. When sowing on cultivated ground, the soil requires to be well worked and lightly rolled after sowing; if on old pasture land, the surface should be well-loosened by harrowing. The best time for sowing is the early spring or autumn. In a good season paspalum may be sown right through from spring to late autumn. It must always be remembered that the seed requires heat as well as moisture to facilitate germination, but if sown in cold weather the seed will remain without injury in the ground until warm weather sets in.—Exchange.

Winter Fodder.

It is highly necessary that farmers, when sowing barley and oats for winter feeding, should not neglect to take precautions against the spread of fungoid diseases, which so often do a great amount of damage to the crops mentioned. In this connection some words of advice from Mr. Pye, principal of the Dookie Agricultural college, are helpful. "Over a series of years," said Mr.

Pye, "I have found that the pickling of barley and oats in formalin, 1lb. to 50 to 55 gallons of water, has been highly beneficial and profitable, and I would recommend any farmer who now sows these crops to carry out this operation of pickling. Bluestone pickle seems to have little effect on the smuts of barley and oats as compared with formalin, hence my recommending formalin in preference to it. Not only the diseases of the ears of barley, but those attacking the leaves, have to be considered, and when barley is sown for green fodder, not only have the plants attacked by leaf blight (Helinin thosporium) an unsightly appearance with their olive-brown patches on the flags, which ultimately cause them to wither up, but their feeding value is considerably reduced, also the development of the grain is more or less impaired." Experiments in order to develop wheats that resist bunt or ball smut have been carried out at Dookie. Although a few of the wheats have proved resistant so far, yet they have still to stand the test for their milling qualities. "A good bunt-resistant wheat," remarks Mr. Pye, "will save the necessity for pickling with fungicides, which will be a saving of money and labour, besides loss due to the non-germination of some of the grains by using too strong a pickle. An interesting experiment in regard to pickling for bunt is the after-effects of bluestone and formalin respectively. Although I have found formalin to be more effective than bluestone (copper sulphate) for bunt or for black or loose smut under normal conditions, yet when there was a likelihood of reinfection the bluestone treatment proved more effective as regards bunt or stinking smut."

Butchering Time on the Farm.

The first thing is a good scalding barrel or tank. I had a tank made of 2-inch hardwood that I use for this purpose. It is about 4 feet across and 2½ deep. After the scalding is done, it is well cleaned, and serves for packing down meat. When I use this tank for scalding, I set the derrick over it and a pig of 400 pounds can be hoisted as easily as a 150-pound pig can be handled without a derrick. My derrick is made of four 2x4s and a block and tackle. This block and tackle is handy for many other jobs about the farm.

When scalded, the pig is hoisted out of the tank and swung on to a bench at the side and scraped clean.

When cool I cut up the meat, and it is left to still further lose all trace of animal heat, then it is rubbed with salt and all allowed to stick that will possibly adhere. Afterwatds, it is packed in the meat tank, the hams in the bottom, the shoulders next and the sides on top. It is allowed to stand in the dry salt for three weeks and then a brine is made that will float a fresh egg. The brine is poured directly on the meat without removing it from the dry salt and it is then left for five weeks longer, when it is taken from the brine and allowed to drain. Then it is hung in the smoke-house and well smoked in the old-fashioned way.

After the meat has been well smoked I take it down and rub each piece with a good coating of borax and hang it back in the smoke-house. Not a fly touches it and it remains sweet and firm ubtil wanted. I do not pack in oats or ashes, as many do and I formerly did. My present method beats all of that sort of thing.

By having the few necessary tools, butchering is not half the work that it is if everything has to be borrowed and taken home again. I have a good set of gambrels which have been saved from year to year. They are always ready.

Some weeks before butchering time I gather a lot of broken posts and ends of boards and dead limbs that are needed to make hot fires. In this way I clean up the premises and have nice dry wood for butchering. Pieces that are full of nails and cannot be well cut with an axe or saw are here put to good use.—E. J. in "Farm Life."

A Word for the Mule.

In a bulletin entitled "The Cost of Horse Labor," issued by the Minnesota Department of Agriculture, there is a picture of a span of mules and the following to say about them :—

"The team, which is fourteen years old, weighs about 2,200 pounds, and it is claimed that they are the toughest team on the farm. They refuse to eat more than about one-half as much feed as horses doing the same amount of work. Many farmers are using mules almost exclusively, and claim they can get their work done more cheaply than with horses. Some people object to mules on 'general principles,' but it is nevertheless a fact that they possess qualities well worthy of consideration by the breeder or farm manager. Their comparatively small consumption and long life, resulting in low depreciation, makes the annual cost of maintenance lower than for horses." This is doubtless quite true, and we need not go as far as Minnesota to hear a friendly word about the mule, but generally speaking, the Australian farmer won't even look at a mule, much less own him, or rather it.

Lucerne for Sheep

During a recent dry spell a New South Wales farmer gave his neighbours a valuable object lesson. Early in the year be bought 400 two-tooth ewes in low condition. They were turned into a hill paddock, in which there was a fair amount of dry feed and plenty of water. When the grass had failed, owing to the continued dry weather, the sheep were turned into a lucerne patch for five minutes each day. He has about four acres of land under irrigation in two paddocks of two acres each. The crop is in its second year, and when the sheep were first turned in the lucerne was about three inches high. The sheep were grazed in each of the two paddocks alternately, one being used as soon as the other was eaten out. This order was observed for about two months, each patch being spelled and given a watering while the sheep were being fed in the other. At the end of March, when they were first let into the lucerne, the sheep were poor, and by the time the rain came in the early part of June they were in excellent condition. With the exception of the 5 minutes on the lucerne each day, the sheep had no other feed but what they could pick up, and the paddock in which they were running was as bare of grass as it possibly could be. Thus, on four acres of land, 400 low-conditioned sheep were maintained, and greatly improved in condition during the worst period of the drought. Do you grow lucerne? If not, why not? Think it over.

(Continued from page 553).

poorest cows were sold before their records were completed. Ma.., others were weeded out shortly after the yearly record had been completed and published.

— Results. —

From information available which induced the farmers to sell their poorest cows it is thought that the productive capacity of the average herd belonging to members of this Association was raised at least 50 pounds butter-fat per cow, as a direct result of the first year's work of this testing association.

While an attempt has been made to show some of the direct profits that came as a result of this work, it is impossible to point out the value and importance of the indirect results of work of this kind. Just as an instance of what it means to the farmer in building up his herd, the tester in charge of this work reported that before much was known regarding the cow that afterward proved most profitable her heifer calf had been sold for 5,00 dollars. After the cow had completed her remarkable one-year record the owner was glad indeed to make an extended trip in search for this calf and to trade for it one of his mature cows. It is also estimated that as a result of the first year's work over eighteen silos were constructed in this community.

Cow testing work represents one of the best and easiest ways of making dairying more profitable and desirable. It is a well-recognized fact that the remarkable success of dairying in Denmark, Sweden, and Holland is largely due to the fact that they saw early the benefits that could be derived from well-conducted co-operative cow testing associations.

It is of course true that many milk producers have little opportunity of enjoying the benefits of association and co-operative work, but after all it is the testing that counts, and fortunately every dairyman can be his own tester.

Prospects of Horse Breeding.

From Live Stock Journal.

Conditions in Australia are somewhat different, but what is written is not without interest for us. There is even less room here for the "misfit" than in England.

With the march of time, and the constant evolutions of wonderful and unexpected inventions, the industry of horse-breeding suffers from some degree of uncertainty....

It is needless to say that the latest great change—the coming of the motor—makes this question more pressing at the present time than it has been for many years, and renders a general survey of the whole situation imperative. Indeed, many men are so pessimistic upon the subject that they consider horse-breeding as an industry quite a thing of the past. But the best way to satisfy ourselves upon the point is to turn to history, and see what has happened upon previous occasions when invention has brought any great change in the chief mode of locomotion.

Perhaps the greatest example we can turn back to, though by no means the only one, is the introduction of railways. Men then said, as they did recently and do now, that the horse, as an animal of usefulness, was doomed. Such, however, was not the case; as great a number of horses have been in use since that day as ever before, railway companies themselves, indeed, being large horse-users. That great and encouraging fact is one of the chief examples from which we can take guidance for the future. When a system of locomotion comes into use, a particular kind of horse may, it is true, be done away with. To take one or two examples. In the old days, before stage coaches came into use, there was a magnificent animal called the pack horse. His business was to carry great weights upon his back, and to travel fast and safely with them. He was a splendid specimen, who did his work well, and was dearly loved by all men of his time; but when the custom became general to put the weights upon wheels and coaches sprang up, he was no longer wanted, and he became extinct.

Then came the turn of the lighter and faster coach horse, who had to run and pull the loads behind him. He was more a special kind of horse than a special breed, but he was of great importance, until (as has been said) trains came and wiped him out.

The next new horse to be wanted was the tramway horse. He was a nondescript breed, chiefly made up of failures in the attempt to get something better. But he came in great numbers; and the same remark applies, though to a lesser extent, to omnibus and cab horses, that have been steadily increasing with the growth of towns and population. And now motor and electric power is gradually, and completely, usurping their places.

Now, what is the lesson which a survey of the situation is to teach us at the present time? Chiefly, that with the going of the tram-horse and his compeers we are losing the principal output for our failures, and that we shall have to be more careful in the future to breed the right animal, and to have fewer failures to dispose of.

Let us venture to suggest a few: Firstly, then, there is every reason to hope and believe that hunters will be wanted in numbers which are more likely to increase than diminish for many a day. Army horses must be wanted; cart and dray horses will be wanted; general utility horses will be wanted; polo ponies will be in demand; carriage horses will be used, but perhaps in diminished numbers.

The reasons are fairly obvious. For instance, it is certain that you can neither go hunting nor play polo upon a motor car; and as to cart and general utility horses, motor traffic is very little likely to cut into their use, because it will be employed for longer, faster, and more organized traffic.

What kind of horse to turn our attention to must partly depend upon our surroundings, but the text of any sermon upon how to get him must undoubtedly be "Stick as closely as possible to

pure blood." Possibly hunters and shire cart-horses are the two sorts which have the best prospects of bringing success to the ordinary breeder, and of the two the latter should produce the fewer failures, because, in that case, you are dealing with pure blood only, and the main thing is to get the best you can and stick to it. To get a hunter is a more difficult matter, as he is, unfortunately, bound to be a cross-bred animal, and, as he is a good example of the way to get any other cross-bred horse, we will deal chiefly with him. In the first place, the prime source of his foundation must be the thoroughbred which is of incalculable value to the land, because the thoroughbred provides the foundation of several of the light horses we have, and he carries on a pure strain of the best blood in the world, which is always available to go to. One of the principal causes of failure in breeding hunters, as well as any other horses, is the extraordinary admixture of blood with which so many of them get impregnated.

Breeding has been carried on in a most haphazard manner. Vague attempts have been made to get something which will sell—if a hunter or a carriage horse, so much the better; if not, he might go in a 'bus or cab. This will no longer do. We must, in future, learn to breed without many failures. To get a hunter, the thoroughbred himself ought to be the ideal, but by some means he just misses it. So if we must have a cross-bred, the best way to get it is to begin with the first cross between two pure-bred animals, and after that to continue to cross one way in order to retain as much purity as possible.

The first difficulty in breeding hunters from a first cross, fast enough to go up to hounds in a grass country, is to find a pure breed of sufficient high quality to mate with the racehorse; so that we must go on to the second or third cross with the latter to get the highest class.

But the first cross between a thoroughbred horse and a pure Cleveland bay mare, or between the former and a Hackney mare of good sort and size, if mated with judgment, will not be a failure.

He will be a hunter or a carriage horse, or, at worst, an army horse. "At worst" ought not to be the word there, but, owing to the price which is paid for army horses, it unfortunately is so.

The second and third cross to the thoroughbred—always supposing the mating is done with judgment—is practically sure to be a hunter. The first cross often is.

The main object of breeding in this way is to get uniformity. You avoid the failures. The cause of nine-tenths of these is attributable to the innumerable strains of blood which some animals have in their veins, so that you never koow after what ancestor the produce may turn. Therefore, whatever be the animal aimed at, let all breeders take for their standpoint—Uniformity based upon pure blood.

Calf Feeding.

There is probably no subject in the whole range of animal husbandry more discussed than calf feeding. The following is from an of an important phase of it is American paper :—

The greatest number of mistakes in calf feeding are made in the period of changing from whole-milk to skim milk. Many try to make up the difference in the quality of the milk by adding quantity. The quickest way to upset a calf is to overfeed with skim milp and try to get it to drink enough to support several calves. Another way to upset the calf is to feed the milk irregularly, and to feed it sweet one day and sour the next. The skim milk should be sweet and clean, the buckets or vessels in which the milk is fed being likewise sweet and clean. Five pounds of skim milk fed three times a day is a great plenty if the calf is eating a little grain with it. Some feeders feed only twice a day after the calf is two or three weeks old in which case 15 to 18 lbs. of skim milk divided into two feeds is a great plenty. This will be even too much for some calves. As the calf grows older, the amount of milk can be judicously increased. In feeding several calves by hand, stanchions are almost a necessity. The calves will soon learn to use them, but when kept in them for a time after being fed their milk, they will get in the habit of sucking each other's ears. They should be fed their grain as soon as they have had their milk. In regard to grain used, there is some latitude of selection. Until the calves eat enough to really help support them, we prefer whole oats, because oats help to keep their digestive apparatus in good shape. As soon as they eat any considerable amount, whole oats and corn in equal parts can be used, or ground oats and corn, or oats and corn meal, or bran and corn. Many feeders feed the calves the same as the milk cows are fed. There is not much danger of overfeeding a beef calf. Dairy calves should not be allowed to lay on fat, according to dairy authorities, as they believe this leads to a disposition for a future dairy cow to put the grain on her back instead of in the pail.—American Exchange.

Every man of true genius has his peculiarity.

The Art of Separating.

— Why the Separator is somtimes unable to skim Milk. —

It is universally recommended to separate immediately after milking, and why this should be so persistently advocated is for the following reason, says Mr. G. Sutherland Thomson, in his work on "Milk and Cream Testing":—

The milk has a very fluid condition It is free from acidity.

It is not dense.

The fat globules are not dangerously grouped.

The adhering power of casein and other substances to fat globules is decreased.

In cold milk we have conditions opposite to the above, which at once explains the inability of the separator to accompish clean skimming. We also observe that when cold and warm milk are mixed together. There is a loss in cream; but this practice is met with more frequently in the colder temperatures of winter. In the summer-time, when milk is kept overnight and separated on the following morning, there is a loss of fat in the cream owing to a degree of acidity or courness having developed, causing an increase in the density. We also of the milk. For this reason it is preferable to separate "old" milk by itself at a time and season when the weather is unfavorable to a high degree of fermentation. We also suffer losses in our cream returns when milk is carted long distances before being passed through the separator, and jolting causes a condition in the milk that taxes the efficiency of separation to its utmost, and may result in the escape of a considerable percentage of cream and butter-fat in the separator milk.

— Speed. —

The speed of the bowl should not be less than the number of revolutions recommended by the manufacturers otherwise a falling-off in the power will reduce the skimming qualities of the separator. The inflow of milk must not exceed the quantity the bowl is capable of treating, otherwise excess of butter-fat will pass away in the skim milk. Irregularity in the turning of the separator will soon show itself in the butter-fat tests of the cream. Young people are entrusted with this important duty, and without knowing the gravity of the work, do not drive the separator at a steady speed, whereupon the inflow of milk is not sufficiently exposed to centrifugal force to effect a proper separation of the cream.

In separating, the operator should be particular to keep a continual flow of milk passing into the bowl, and not stop or slacken speed because the receiver is empty. Separating should be conducted so that the receiver is never permitted to exhaust itself, and this will reduce the possibilities of loss

When water or skim milk is run into the machine before and at the close of working, the percentage of butter fat in the cream will not suffer, as is sometimes believed. Care should be devoted, however, to the addition of regular quantities of skim milk, which is preferable to water to remove the cream adhering to the plates or inside parts of the bowl when separation is finished.

As every owner and those engaged in the working of separators know that altering the screw or regulator causes a variation in the thickness of the cream, it should not be practised except when there is a just and reasonable cause given.

In hot climates, the author would recommend that the proportion of fat in cream should not be lower than thirty per cent. and not higher than forty per cent. In the hot months of the year thin cream churns readily in transit to the factory, making it impossible to obtain a true sample for test purposes. It might also be mentioned that, in this quality of cream, whey is quickly produced from the excessive quantity of milk contained in the product, and which has a most harmful effect on the butter.

To prevent cream from adhering to the discs of the machine and other parts of the bowl and escaping in the skim milk, it is recommended to run a small quantity of warm water through the separator before the addition of the milk.

Separators must be thoroughly cleansed of the bad slime immediately after working, and not allowed to remain in abeyance until a "convenient" time during the day or shortly before use again. To disregard to wash and scald the bowl and its parts morning and afternoon when separation is conducted after each milking, under the belief that once a day is sufficient, will occasion heavy losses of cream, and the development of hurtful flavors will immediately begin in the product.

— Colostrum. —

Do not separate colostrum. When quantities of colostrum are separated same soon accumulates in the bowl and retards efficiency of the working parts of the separator. "New milk," as most people are aware, contains a high percentage of solid matter, having a sticky consistency, and possessing an offensive smell when left exposed to the air for an hour or two in warm weather. It is, therefore reasonable to expect that grave dangers to the quality and keeping properties of cream arise from want of care in this direction. It should be recorded as a serious offence for any dairyman to use milk from newly calved cows until the high color and peculiar smell have disappeared. In some instances these characteristics can be traced in milk up to fourteen days from the date of calving, and even longer.

When milk is preserved and kept for hours and then separated in a slighly acid condition, although not perceptible to ordinary observation good results are not obtained.

Eulogy on the Cow.

An American dairyman after contemplating one of his 1,000 gallon cows was moved as follows. There is more of it but we quote sufficient to show how he felt.

"Grand and noble brute! Of all God's animal gifts to man, she is the greatest. To her we owe the most. Examine into all the different ramifications and channels of our commerce into which she enters, and note the result should she be blotted out. A Sunday stillness would then pervade the great stockyard industries of our large cities and grass would grow in the streets. Seventy-five per cent. of the great freight trains that plough the Continent from ocean to ocean would side-track, for there would be nothing for them to do. Fully fifty per cent. of the laborers of America would draw no pay on Saturday night, and our tables would be bare of the greatest luxuries with which they are loaded. The great Western plains that she has made to blossom financially, like the rose, would revert to the Indian, from whence they came, and millions of prosperous homes would be destroyed.

"None other like the cow! There is not a thing from nose to tail but what is utilised for the use of man. We use her horns to comb our hair; her hair keeps the plaster on our walls; her skin is on all our feet and our hosses' backs; her tail makes soup; she gives our milk, our cream, our cheese, and our butter, and her flesh is the great meat of all nations. Her blood is used to make our sugar white and her bones when ground make the greatest fertiliser, and in her paunch she herself has put through the first chemical process for the manufacture of the best white board paper, and it has been discovered that that paper is the most lasting material for the manufacture of false teeth. No other animal works for man both day and night: by day she gathers the food and when we are asleep at night she brings it back to re-chew and manufacture it into all the things mentioned above. She has gone with man from the rising to the setting sun; it was her sont that drew the first prairie schooner for the sturdy pioneers, as inch by inch they fought to prove that "westward the star of Empire takes its way," and the old cow grazed along behind, and when the day's march was done, she came and gave the milk to fill the mother's breast to feed the suckling babe that was, perchance, to become the future ruler of this country.

Economical Milk Production.

When a man goes into any business he should choose the appliances best suited to his purpose. If we are to produce milk economically, first we must choose an animal capable of producing milk and producing it cheaply. We should not expect to produce the best and cheapest milk by taking an animal that has been taught by long selection and feeding to produce beef, but rather one that has been bred and fed with the one idea of turning food into milk.

Even the best dairymen do not appreciate what a remarkable animal they have in the dairy cow. As an example of what a cow will produce if she is bred right, an instance is on record of a cow which weighed before dropping her calf 1,600 lb., and in 30 days after calving produced 1,983 lb. milk or 383 lb. more milk than her own weight.

Having secured the right kind of cow we must give the best possible care. The cow should be so circumstanced that she will expend the smallest amount of food possible in the maintenance of her own existence. We know that even under the best conditions four-fifths of all the cow eats is used to keep her warm. We might keep our cows under such unfavourable conditions that it would be impossible for them to eat enough to keep themselves warm, leaving nothing for the production of milk. It is here that comfortable quarters or warm rugging in winter counts.

Brown Swiss Cattle.

The Brown Swiss and the Dutch Belted are perhaps the two most important of the European breeds of cattle which have not as yet found their way to Australia. Of the former an English authority on dairy cattle writes—It is a general characteristic of these cows to show a high degree of efficiency in coverting feed into flesh, and a pronounced characteristic that they are not of a nervous disposition or habit. It is not necessary to keep strangers out of the barn or to avoid talking at milk time. A barnful of them, or a single one, will go on stolidly giving the regular yield of milk, undisturbed through a commotion that will quite demoralize more nervous cows. Growing out of the strength of constitution and the absence of nervous fidgets is the characteristic long life of the Swiss breed. At 11 or 12 years of age the cows are in their prime. It is probable that the Brown Swiss race has quite a different origin from the races of western Europe. There are indications that it is more ancient than any of the other established races. They have been bred by a pastoral people for the same purpose, in the same locality, for a longer time than almost any other breed. Its general character, its color points, its points of conformation, are probably more firmly fixed than those of any other breed. As a consequence the breed characteristics are readily imparted to cross-bred animals when cows of other breeds or grades of other breeds are bred to Swiss bulls. Grade Swiss cattle, even of the first and second generations, are often hard to distinguish by their conformation and color marks from purebred Swiss animals. The grades are sure to gain in dairy qualities over their dams, and to have in addition size, constitution and hardiness.

In Brown Swiss cows we have a constitution to which a fair amount of flesh is normal, a contented but hearty disposition, an absence of worry, but a great capacity for making milk and butter fat. All we have to do is to work in accord with nature, and without sacrificing anything of profitableness for the dairy, we have a strong and sturdy type of beauty, and especially that kind of beauty which exemplifies the proverb, "Handsome is that handsome does." An average herd of cows in milking condition would weigh 1,300 to 1,400 pounds each. They tend to take on fat readily when dry and give it off slowly when in milk. The average cow when fattened would weigh 1,500 pounds or more. Bulls in good condition would weigh from 1,700 to 2,500 pounds. The Swiss calf at a month old will weigh 180 to 200 pounds, and at a year can weigh 900 pounds, and at two years 1,500 pounds. The highest official world's record in a dairy test for cows away from home is that of the Brown Swiss cow Brienz 168, made some years ago at the Chicago World's Fair at Chicago. In three days she gave 245 pounds of milk, and 11.66 pounds of butter.

Save Valuable Time.

Very often an immense amount of time is lost in trying to perform a piece of work with a tool in poor condition, that otherwise could be done in a short time with a tool in good condition.

The harvest season is always a busy time, yet many farmers leave the repairing of their harvest machinery until they want to use it before making any effort toward repairing. Consequently the grain becomes dead ripe, and a great loss results from shattered and over-ripe grain, besides the loss of high priced labor.

When bad weather comes, gather the tools into the shop and repair them. See that the hay rakes are in good condition before they are needed, mowers and binders all tightened up and all of the worn out parts replaced with new ones during the winter months. Repair and grease the harness, and never allow a shovel or dirty tool of any kind to be put away until it has been thoroughly cleaned and brightened up.

There should be a place in the shop for all hand tools; wrenches in one place, saws in another, and so on with every tool. Nails and bolts should be kept in handy places, and a liberal store of the things mentioned, and many others just as important should always be on hand, thus avoiding the necessity of a trip to town, or working without them until a trip can be made to town.

Farmers should have a knowledge of forge and carpenter work, that they may be able to do their own repair work.—Exchange.

The Manufacture of Butter from Home-Separated Cream.

(By J. R., Manager Butter Factory, Tasmania).

I wish to start with the assertion that it is just as possible to make good butter from mixed cream, as it is from mixed milk. Both of these products are very much mixed when they reach the factory. In grading them the advantage is in favor of the cream, as it is much easier to detect faults in cream than it is in milk.

I have been making butter under both systems for the last 15 years. Part of that period was all milk, then from milk and cream, and for the last five years from nothing but mixed cream, and my experience during that period enables me to make the assertion which I started off with.

Looking back and comparing the days when we received nothing but milk at our factory with the present time, when it is all mixed cream, I can safely say that there has been a very great improvement in the dairies, and also in the treatment, which the raw product receives at the hands of the dairymen. Under the milk system any filth—or shall we say foreign matter—which may fall or get into the milk, remains in it, until it reaches the factory and contaminates the butter fat; but in the home separator system any harmful matter is separated out at once, and with reasonable care on the part of the farmer the cream could be delivered at the factory pure and clean.

I have found that a few simple rules printed on a piece of cardboard and hung up in each dairy will help to accomplish the desired result. These are as follow :—

1. Cream must be sent to the factory at least three times a week.

2. Each separation must be kept by itself in a clean vessel. Do not mix till sending to the factory.

3. Do not mix hot cream with cold.

4. Cream must be separated thick 45 per cent. to 50 per cent.

5. Cream must be kept in a cool, clean place at least 50 yards from cow and pig sheds.

6. Cream, if left on the roadside, must be placed in a sheltered place or small shed, where it is not exposed to the rays of the sun.

7. Suppliers must not put salt or any kind of preservative in the cream.

8. Cream with beastings in it, or in rusty cans, also bad flavored or over-ripe cream, will be rejected.

Your factory has a high reputation, and to maintain this suppliers must send good cream.'

I have no doubt that you are familiar with most of these rules, but I believe that No. 2 is new to you. Cream must not be mixed until ready to send to the factory. If you will adopt this rule at your factory, and also enforce it, you will have material to work upon as good as the best you ever had under the milk system. The whole success or otherwise hangs on that regulation. I am certain of this, and this is the principal reason why I have written this paper, to bring under your notice this simplest of simple things. The usual custom is to mix it as soon as it is cold and then stir it frequently. A wooden spoon is generally used, and it is seldom if ever cleaned ; thus it becomes a battery of unfriendly bacteria ready to infect can after can of cream. Therefore I do not ask suppliers to stir their cream at all. Stirring is not necessary if the cream is not mixed. A number of large billy-cans will do to keep each of the separations in, and these with the cream in them can be hung up in a cool lime sweetened dairy, and when all the cream is the same temperature it can be emptied into the cream cans when the time arrives to send it to the factory, and not a moment before.

We strongly condemn the use of cloth strainers. Brass or copper gauze is best, and perforated zinc is good to keep the flies off the cream. Cream cans should be made of steel, and of one diameter from top to bottom, with semi-locking lids. All the cans should be of a uniform width, then they can be washed by revolving machine brushes, which do this work better than it can be done by hand.

— Cream Grading. —

A capable, careful man grading will do more to keep suppliers up to the mark than anything else. The cream should be tested first by smell the instant the lid is taken off the can ; afterwards it must be tasted. I have known managers who would not taste cream. Well, all I can say is, if it is not fit to be tasted it is not fit to be made into butter.

— Cream Weighing. —

It is a good plan to have the weight of every can verified by more than one man. The man lifting the cans on and off the scales can call out the supplier's name and the weight and the clerk as he enters up can glance at the scales to verify it.

I need hardly mention the necessity of running all cream through a strainer and then over the cooler and into the maturing vats over open tinned steel shoots. The abominable practice of using a pump to pump cream, through pipes has surely been abandoned by all up-to-date butter factories. It was almost impossible to get the pump clean, and utterly impossible to get the pipes, through which all the cream was pumped, clean.

— Cooling Cream. —

To get the best results, that is, ta make the best butter from home separated cream, it should be cooled down simultaneously to from 4 to 6 below churning temperature, to retard the rate of acidity. I have tried making the mixed cream up into butter two or three hours after it arrived at the factory ; but I found that it made a better butter by keeping it until the next day, the same as for butter from mixed milk.

In testing, I get the same results by testing fortnightly as I did by testing daily.

— Sampling. —

I got a more accurate sample with a tube two inches in diameter than with the half sampler generally used.

In conclusion, there is no doubt that it is much more difficult and harder work for the manager, and adds considerably to his responsibility, to make butter from mixed cream as against mixed milk ; but the wisest course is not to oppose the dairyman in his wish to adopt this system. But we ought to aim at regulating the mixed cream system so that the butters will be as good as it is possible to make under any other system.

Shelter, constant supplies of food, and the selection of the best milkers will receive more attention when it becomes necessary to reduce the cost of butter production.

We may know always what is right but not always what is possible.

Strangles.

Strangles is a highly infective disease of horses, asses, and mules, and is caused by the introduction into the system of a micro-organism called the Streptococcus equi. The majority of cases occur in young animals, but it may occur at any age; it frequently occurs in epizootic form, is particularly liable to attack animals suffering from over-exertion, a chill, catarrhal affections of the mucous membranes, dentition, or surgical operations, and it is aggravated when numbers of horses are massed together under insanitary conditions, or are moved long distances to where different climatic influences prevail.

It is generally accepted that there are three types of the disease: the regular or mildest form, the irregular, and the malignant. The symptoms of the regular form are generally confined to the mucous membranes of the nose and mouth, with loss of appetite, fever with high temperature, catarrh, and swelling under the angle of the jaw. At first the mucous membranes are slightly red and inflamed, a watery discharge issues from the nose, mouth, and eyes, which later on becomes thick, opaque, and sticky, and finally the mucous membranes may show superficial excoriations. In the space at the angle under the jaw small hard lumps may be felt, which are inflamed lymphatic glands; these inflamed glands in a short time become surrounded by exudations, which give them a doughy feeling; they gradually become enlarged, and frequently fill up the whole of the intermaxillary space; later on these swellings generally suppurate and form abscesses, but occasionally the exudate may be absorbed, and re-solution take place without this occurring. It is rare, but quite possible, for strangles to occur without these glandular swellings The period of incubation of the disease is from five to ten days; its duration is indefinite.

I have stated that the disease is caused by the entrance into the system of micro-organism called streptococci; these streptococci generally obtain entrance through the air passages, but occasionally through wounds, and when the disease is irregular, it is due to their finding their way through the lymph channels to other parts of the system. We find, therefore, in the irregular form the trachea (windpipe) and bronchial tubes become similarly affected; extension to the lungs gradually takes place, and in such cases there will be, in addition to the simple form of strangles I have described, all the symptoms of broncho-pneumonia; again, the bowels may become affected, more especially when the disease follows on surgical operations, in which cases abscesses may form, which eventually burst either into the lumen of the bowel or into the peritoneal cavity; in the latter case it is always fatal. Again, the brain, spinal chord, or other parts of the nervous system may be affected, causing vertigo, blindness, paralysis, or coma; the skin, also, may become affected, numerous small pustules occurring in different parts of the body, especially about the mouth and face; abscesses in different parts of the body may also form. The malignant form is characterised by a general rapid septico-emia (blood poisoning), which is marked by extreme prostration, hurried breathing, and rise of temperature, ending in fatal collapse.

There is rarely any difficulty in diagnosing strangles; the nasal discharge, the weeping from the eyes, and the submaxillary swelling are, as a rule, sufficient, especially when more than one case occurs in the same place.

Strangles is a disease that admits of undoubted benefit, by the enforcement of sanitary measures, attention to diet, and a certain amount of mild medication. On the first symptom occurring, the animal should be placed in a warm loosebox by itself, where the ventilation is good, if out at grass and the weather is mild, it may be rugged and left out, taking care other horses are not allowed in the same enclosure. The loosebox, stable utensils, drinking vessels, and manger should be whitewashed with a six per cent. solution of chloride of lime, say, a pound to 2 gallons, occasionally repeated, and kept scrupulously clean. The stable utensils, especially the drinking vessels, should not be used for other horses. The sweepings from the manger and stable should be burnt, and not thrown on the manure-heap, as they will contain the germs of the disease, which, if put on the land, will retain their vitality, and may later on affect other horses. Any sore places should be dressed with carbolic oil or ointment. The animal must not be worked, but may take quiet exercise.

The diet must be easy of digestion and nourishing—carrots, turnips, cut greenstuff, freshly cut lucerne, scalded hay, and occasional bran mashes, with plenty of pure drinking-water. With regard to medicines, in the mild cases it will be sufficient to see that the bowels act regularly, and that the submaxillary swellings are attended to. Linseed tea, or three or four ounces of Glauber's salt in the drinking water will generally act as a laxative, and the swellings must be poulticed and fomented till they become soft; they should then be opened, but care in this is necessary. The skin only should be cut through with a sharp knife, and an opening to the matter be made with a blunter instrument, so as not to cut the blood vessels, nerves, or ducts of the glands, which are numerous in this part. In case the swellings do not come to a head, a small fly-blister will be the best thing to apply. The air passages should be steamed with hot water containing some disinfectant, such as phenile, other carbolic preparation, or eucalyptus oil. A bag drawn over a bucket with a little hay in it scalded with the hot water and phenile and pulled up over the nose (not too close) is an easy way to apply the steam. In the irregular form the treatment cannot be given, as it depends on the complications occurring; but both in this form and in the malignant form veterinary advice is essential.

One attack of strangles confers a certain amount of immunity from further attack; such being the case, in some countries it has been the custom to produce a mild attack by artificial means, and so insure protection from a more virulent attack later on; this is done by taking a small quantity of pus or mucous from a mild case and smearing it on the nasal mucous membrane of the animal to be infected.

As strangles is a highly infectious disease, it is incumbent on the farmer or horse-owner to be careful to protect his own animals when the disease is suspected to be in the district. He will be careful what outside horses he admits to his own stables; also in what stables or paddocks he leaves his own horses, and where they are stabled on sale days; he should avoid public drinking troughs, and forage from an affected farm or stable. Watch for first symptoms, and on their appearance separate the horse from the others.—From the Tasmanian Journal of Agriculture.

A stout heart may be ruined in fortune but not in spirit.

Stud Stock Breeding.

Whether viewed as a hobby or with a serious eye to future profits, there is something very attractive in the vocation of stock breeding.

To those who have but recently joined the ranks, or to those who are merely still in the condition of contemplating a move in so pleasing a direction, a few words of advice, extracted from a lecture delivered at Aberdeen University by a successful breeder and exhibitor of stud stock, is quoted by Elder's Review as being practical and to the point. The most competent to give sound and reliable advice on any subject pertaining to stock-breeding are those who have themselves successfully solved problems regarding which they desire to assist others. No doubt the keenest discrimination is necessary in the selection of a breed or breeds suitable to a locality, but when once this initial proceeding has been satisfactorily disposed of, the underlying principles of management are practically identical, whatever the class or breed of live stock chosen. The common proceeding, especially by those who adopt the pursuit as a pleasant pastime, but who, nevertheless, desire to conduct it profitably, is to acquire the most prominent individual animals of the day, regardless of such vital considerations as the consistency of pedigree or the competence of the men placed in charge thereof. To those about to embark on stock-breeding, the lecturer emphasized two points, and every successful breeder will endorse the wisdom and soundness of the advice. Proper accommodation at the homestead and a competent man in charge constitute the inevitable and enduring basis of success. Having fulfilled these conditions, the selection of the animals with which the herd, flock, or stud is to be built up may proceed as opportunities occur. The building up of a good herd is necessarily the work of many years, and possibly the greater part of a lifetime. There are some, especially among the younger generation, who are impatient and ambitious enough to attempt by lavish expenditure in the acquirement of noted show animals, to attain to the highest rank right away. The number who succeed in doing so is exceedingly small, while a very much larger proportion, on finding themselves unable to accomplish the task, abandon the project in despair.

Beginners should avoid the temptation of buying on show-yard rather than herd-book qualifications. The aspirant who is most likely to realize his desires is the man who makes up his mind as to the particular strain or type of animal he is to produce, and, having done this, to resolutely carry out his ideas in practice. Consequently he should not allow himself to be tempted to buy show animals not exactly of the class or pedigree likely to improve his flock, herd, or stud, merely because that animal has scored in the show ring. In the case of bulls, which, with the great progress made of late in the dairying industry have become a feature of all shows, the need for such exacting discrimination is especially necessary. In this respect, especial care should be devoted to breeding in relation to that of the cows already in a herd, so that, as far as may be practicable, the sires selected should be calculated by their own individual merit to correct any possible defect in the conformation of the cows. In reference to the feeding of animals, whether for show purposes or not, the key to success lies in strict moderation: sufficient condition should be maintained for all practical purposes, as all stock then breed more regularly than if in receipt of too liberal a diet. Pedigree cows should be allowed to suckle their calves, but until such period as the calf is able to take the whole of the dam's milk, in order to encourage the milking propensities of the cows, each animal should be milked dry at least once a day.

Poultry Notes

F. W. Marshall.

By the departure for Mr. F. W. Marshall for England, there to take up an important business appointment, South Australian poultry breeders and dog lovers lose a fellow-worker to whose energy, ability, and disinterested enthusiasm they owe much. If for no other reason, the solid stand Mr. Marshall has always taken on the side of all that is clean, honest, and of good repute in the kindred fancies, will have deservedly earned for him the cordial thanks and grateful remembrance of all who have the interests of good sportsmanship and true progress at heart. We are certainly not of those who think that the species fancier of the genus homo has short memories for benefits received, but the time is fitting to recall to the recollection of older members of the fraternity, and perhaps inform some who have come into the game more recently, of his work amongst us during the last ten years or more—indeed, we look upon such reference as an evident duty; a duty which we find as pleasant as it is obvious—though considerations of space, as well as regard for Mr. Marshall's native modesty, forbid our doing more than make brief mention of some of the details which go to make up the sum of his services rendered.

Laying competitions are now so much a matter of course that few remember that they had a beginning, or the circumstances of their initiation in South Australia and the difficulties which had to be overcome; and it stands to Mr. Marshall's credit that the Magill competition—the first of the series—was held where and wher it was, and under such eminently satisfactory authority as that of the South Australian R.A. & H. Society Again, after the completion of the first test at Roseworthy, and when the Society were disposed to drop a somewhat costly experiment, it was in response to Mr. Marshall's urgent pleading and his able statement of the good competitions were doing, that the Society consented to undertake a third, and, as far as they were concerned, final competition. In this matter Mr. Marshall undoubtedly did valuable work, not only for poultry but for the State at large.

Mr. Marshall did not concern himself only with the egg production side of the industry, but also entered keenly into the possibilities of table poultry export—collecting statistics, convening meetings, publishing information in the press, and generally trying hard to kick the question into life. Finally, believing that example was better than precept, he got together, and despatched a trial shipment on his own account. Since then the matter has slumbered more or less peacefully in other hands.

It is, however, to the Fancy side that Mr. Marshall has given his warmest and most enduring affection. He has not, indeed, been an active competitor, or only so to a small extent, but in the routine, and often thankless task of the making up of acceptable, up-to-date schedules and the provision of prize money, he has been a most faithful servant, with a special gift, perhaps, for the acquisition of cups, trophies, &c., for presentation by the various clubs with which he has been connected. Many a handsome trophy, such as the Competition Cup, the Breeders' Trophy, the Challenge Shield, and others now occupying places of honour in fanciers' homes, owe their presence there to F.W. M.'s ability to extract guineas and other coin of the realm from the pockets of his friends. It is, however, only the barest justice to say that if Mr. Marshall has been quick to get, he has been even quicker to give, for no one has contributed more readily or more generously to any and every reasonable project for the furtherance of the Fancy.

As President, Chairman, and Committeeman, Mr. Marshall has rendered invaluable assistance to the Poultry and Kennel Club, to the Royal, and to the Bulldog, Terrier, and Malay Clubs, with the foundation of which he was intimately associated. In each and every office he has been equally at home, and equally successful.

There has never been any possibility of stagnation so long as Mr. Marshall had a hand in the game. "Do something, and do it thoroughly" has been his motto, one which he has entirely lived up to; and it is because of the sincerity and genuine wholehearted enthusiasm which has always characterised his interest in the fancy that those who have sometimes differed with him equally with his most staunch supporters, will join in wishing him good health, long life, and happy fortune in his new home beyond the seas. He may, indeed, rest assured of the goodwill and kindly remembrance of all those with whom and for whom he has worked so long and so well.

What stronger breastplate than a heart untainted.

Secrets of the Show Bird's Toilet.

— The "Bloom" of the Show Bird. —

Perfect condition plays an important part in the securing of prizes. In a show bird, it holds the same relation as the "height of bloom" does in a flower; i.e., at a certain period the bud will unfold its petals and gradually blossom into the flower. It is then in its height of bloom—in its best possible condition, after which it will wilt. Similarly, with a show bird. When in "bloom" its plumage will be lustrous and plentiful, the head a bright red in colour, and the bird throughout will be in its most handsome dress. From that time the plumage will lose its gloss, the comb will turn pale, &c.

The "bloom' 'of a show bird implies several things: First, good physical condition; second, ripeness; third, proper domestication.

Good physical condition insures life, vigor and style. In an athlete, we speak of this stage as "fitness."

— The Finish of Plumage. —

Ripeness refers to that stage when the feathers have acquired their length and fullness without the loss of their brilliancy and pureness of colour. It is then that the specimen possesses "finish." The fullness and finish of feather is important in certain lines of the bird. The arch of the neck, the curve of the back, the depth of saddle, and the shape of the tail are attributes of a show bird that depend largely upon this stage of the feathering process. The weight, carriage, shape of breast, &c., depend upon the body growth.

A Feathered "Grand Stand" Player.

Proper domestication is the result of sufficient cooping and training to give the bird sufficient repose and confidence to assume desired poses under showroom conditions. The importance of training a show bird to pose, to play for the "grand stand," so to speak, is too often overlooked. Once upon a time in those happy days of short pants, as the story book tells, we were the proud possesor of a Game Bantam cock that would pose for three minutes without ruffling a feather. This little trick was the delight of our boyhood friends and many times he would be called upon to respond to an encore. Training to pose is a simple matter, patience being the chief requisite.

Now for a few of the essential preliminaries. First, select the best birds and seperate them. They can be given more attention and fed little luxuries that would be too expensive to feed the flock. The birds become gentle and will learn to eat from the hand and it is much easier to teach them to pose, and any fear that they may have or shyness will be gradually overcome.

— The Training Preliminaries. —

About two months before the show, place them in separate training coops for a few hours at a time. Gradually confine them for a day and finally two or three days until they become perfectly familiar with living within a coop and lose all timidity from being confined and handled by those who have them in charge. The coops should be models of comfort and cleanliness. We have found fine, dry bran covered with clean straw a most excellent litter for coops, if the droppings are regularly removed so that they may not stain the plumage.

Your birds should be handled, groomed and petted each day. A specimen that will walk boldly up to the judge as he approaches the door of his coop wins the admiration of the judge at once. A well-trained bird often catches the judge's eye even if it is inferior to the one in the next coop that is untrained. Fowls should be taught not to become frightened at the presence of strangers, women and children that will visit the exhibition hall. If your birds are so well trained that they will scarcely notice the approach of strangers, you may feel reasonably well assured that they will remain quiet in the disorder and surroundings of the exhibition hall.

Training via "The Stomach Route."

How can birds be trained? The first training is given while feeding in the coops referred to above. Feeding dainty foods, such as meat, will attract the birds to you. In a short time they will eat from your hand. Go to the coops often, but go up to the birds gently and avoid frightening, always trying to tempt them with something to eat. There's an old saying that "the way to reach a man's heart is through his stomach," and it will also be found to be successful with fowls. Handle your birds at first by the light of a lantern at night, as they are much quieter and easier handled.

After your birds become somewhat reconciled to the coop and surroundings, take a slim, light stick and gently stroke along the back from the neck to the tail until they do not mind it any longer; then try the hand, taking the forefinger and stroking lightly under the throat, at the same time raising the head slightly at each stroke, and you will find that in a short time you can place them in any desired position.

Occasionally, take an old hen under your arm and go in front of the coops of the males, and they will soon learn to be looking for the old hen when a person steps in front of the coops and so will show to best advantage and make a good impression on exhibition. So much for the training; now what about their food?

The Show Birds' "Training Table."

Always feed a variety of foods and often. The wet mash should be well made, mixed with skim milk. A crumbly mash will be relished for the early morning feed when quick digestion is wanted. This followed by a little grain later on throughout the day, varying the food from time to time and always being guided by the likes and dislikes of the fowls you are fitting. It will be a good plan to mix a small quantity of linseed meal with the mash feed of coloured varieties, a little each day makes the feathers glossy and lustrous, and is also a good tonic for the system.

In addition to the regular diet of grains and soft feed, a little raw meat and ground bone will help keep their appetite on edge if not fed in excess. It keeps them vigorous and reddens their combs and wattles. Green food, such as sprouted oats, cabbage, turnips or mangolds, grit, bone and char-

coal are also necessary to obtain that "bloom" on your show birds.

Each bird should be weighed once a week and the record kept. If for any cause your birds do not gain in weight rapidly enough, it will be found an advantage to add one-half teaspoon of brown sugar (per bird) to the mash. This causes them to take on flesh more rapidly, but should be fed with care. Cornbread soaked in milk, or hard boiled egg will answer the purpose of meat and ground bone if your males show a tendency to develop too large combs and will not endanger the condition of the birds.

— Recipes for Preparing Washing Solutions. —

Use only soft water—never use laundry soap. We have obtained excellent results by using a liquid shampoo mixture when washing a pen of White Wyandottes. When dry, their plumage was immaculate, white and fluffy with a beautiful finish. A White Orpington breeder gave us the following recipe of a washing cream which he uses in the first tub: Chip two bars of Ivory soap, dissolve in one gallon of soft water and add 4 ozs. of a good shampoo mixture. Then dissolve one teaspoonful of pulverized chloride of lime, one teaspoon of oxalic acid and six teaspoonsful of ammonia in a pint of boiling water. Mix these two preparations together until properly blended, cool, bottle the cream in glass fruit jars and when using put enough in the first tub of water to make a good lather.

We have had good results in using the following mixture: Dissolve one and one-half bars of castile soap, two teaspoonsful oxalic acid, one teaspoonful chloride of lime, two and one-half ounces of borax powder and one teaspoonful of ammonia in two quarts of boiling water. Keep airtight in fruit jars and use as a washing solution.

After the birds have been thoroughly rinsed in two tubs of clean water, prepare the bluing water. It is almost impossible to describe verbally the amount of bluing to use, because of the different strengths of the many kinds of blue. Experiment on a few birds first by colouring the blue bath with a variety of colours, some weak and some strong, until the proper tint can be obtained on the specimen when it is dry.

— Bleaching. —

Bleaching is a rather delicate subject to handle in print. If one were to expose the treasured secrets of the "bleaching artists"—just imagine what would happen! There are a variety of methods used in bleaching white fowls. To procure the fashionable "dead white" colour is a complicated process and could hardly be mastered by an amateur.

Brassines, straw colour, and "sunburn" on the lower hackle, back, wing bows, and saddle cannot be removed with peroxide of hydrogen alone. Its use as a bleach has become widely known because of the many "drug store blondes" among the eternal feminity and has led many to experiment with it as a bleach on white fowls.

— Generated Gases Cause Bleaching. —

During the early winter of 1911 while preparing a string of white fowls, we noticed that one of the best hens was showing a tendency to become brassy. About two weeks before the show she was washed, and when partly dry, a spray, that would throw a fine mist, was filled with a mixture of three parts of peroxide of hydrogen and one part of strong ammonia and sprayed over the brassy-coloured sections. Her body was immediately covered with a sheet of oiled silk to confine the gases generated by the union of two chemicals. These gases produce the bleaching effects. This hen was washed three times and was bleached after each washing, when partly dry. When on exhibition, not even a creamy tint was visible. Several good judges handled her and remarked about her general excellence.

— Importnant to Use Only the Best Materials. —

But the best way to bleach with this peroxide and ammonia mixture is to place a clean muslin cloth in a china bowl, pour three parts of peroxide over it, then quickly mix one part of strong ammonia with the peroxide. Take out this cloth and immediately blanket the body of the fowl with it. Then quickly cover the wet cloth with a sheet of oiled silk to confine the gases and gently press the coverings on the straw-coloured sections of the fowl's plumage. Use only the very best materials and do not expose them, at any time, to the air, as they lose their strength rapidly. Prepare fresh mixtures every time it is applied. This is very important.

— Bleaching by Bluing. —

A few years ago a certain White Wyandotte surprised his competitors by exhibiting large strings of birds with wonderfully pure colour at the fall and winter shows. On being questioned, he denied that he had bleached his birds, and said that he never used anything but Ivory soap, bluing and water. Everyone was puzzled. The question was: "How does he do it?" So one day while travelling near his plant, we stopped off to enjoy a little chat with him, but were disappointed at not finding anyone home at that time. But Dame Fortune was good—his wife arrived. Soon we were being shown among the White Wyandotte pens. In one pen we found "blue" White Wyandottes. "What are these?" we asked. "Some of the best birds," she answered. Soon afterwards our friend arrived. We were invited to stay for lunch and during the conversation he volunteered to explain his methods of getting pure white colour, on condition that we would never disclose it as long as he bred Wyandottes. Since that time he has retired from the poultry business.

About ten weeks before the show he would dip the birds in extra strong bluing water, long enough so that their under-plumage would be thoroughly saturated, and he would repeat this operation twice between that time and a week before the date of the exhibition. About five days before shipping, he would thoroughly wash the birds and repeat the washing, if necessary. His theory was that the oxalic acid in the bluing

powder made a slow, but sure bleach. There is quite a trick in doing this, and we would advise trying this method on a few utility fowls before experimenting on the choicest birds.

— Drying and Fluffing. —

Mr. Hare's method of drying and fluffing show birds in the drying pen of his design cannot be beaten. It will be best to describe it in his own words:

"In our own plant we made use of a special drying pen, heated by coal-oil stoves. This pen is 6 ft long, 5 ft. high and 2 ft. wide. It is divided in the middle into upper and lower compartments with wire netting on top of each. The back, ends, and the lower half of the front are boarded; the four corner pieces are 2 in. square by 5 ft. long. There is a roost 3 in. wide on which the fowls stand, placed 2 in. above the wire netting top of the lower compartment. A piece of burlap is used to cover the wire top and a burlap curtain can be lowered in front when more heat is required.

"A door is made at the lower part of the front, through which the coal-oil stoves are inserted. This door is narrower than the opening, so as to allow fresh air for the stoves. One coal-oil stove is required for every foot in length. A pen 6 ft. long will accommodate from 8 to 10 fowls at one time. You can make the pen 4 or 5 ft. long, if you do not require one as large as we had.

"The washed fowl is placed on the roost of the pen and the front and top curtains are dropped to increase the temperature. If the latter seem too high, a corner of the front curtain is pinned back, or the top curtain is pushed to one side.

"The washing of the other fowls can proceed until all are washed. During that time, it will be advisable to have an assistant separate the plumage of each wet bird (without removing it from the roost) and in this way make it possible for the hot air to dry out the fluffy feathering near the skin. If you wash 20 birds, the first will be almost dry before you finish the washing. As the wet birds fill up the roost, the ones that were washed first are stood on top of the pen, or placed in exhibition coops at the side.

— Drying with a Barrel Dryer. —

"It is sometimes difficult to dry the feathers of the upper portion of the birds. For this we used a barrel dryer. A number of 1½ in. holes were bored near the bottom of the barrel and a cone shaped galvanized iron top was made by the tinsmith. This top concentrated the heat of the coal-oil stove, and by turning the fowl on its side or back, and placing it over the barrel, any slow drying portion of the plumage, such as the junction of the hackle and back feathers, underneath the wings, &c., can be reached and a uniform drying produced.

"We always made it a rule to turn out the birds perfectly dry before we left them. This necessitates more work than simply placing the birds in a coop by a stove and letting them dry at their own convenience, but one has the satisfaction of being master of the situation at all times. Fluffy birds like the Asiatics should have the feathers of the fluff opened up and turned back until dry, so as to improve their appearance. Leghorns and close-feathered birds should not have their feathers opened more than necessary after they are partially dry, in order to keep them looking trim and neat."

When the white birds are dry, it is a good plan to fill a small-mesh sifter with powdered cornstarch and to give the birds a good dusting. Hold the bird by the feet, head downward, and sift the starch into the feathers. This will keep them clean before showing. The morning before they are judged, turn each bird down so that it will shake out the starch. A little practice on a few birds will be helpful in this matter.

In all things throughout the world, the men who look for the crooked will see the crooked, and the men who look for the straight will see the straight.—Ruskin.

Report of the Maine Experiment.

By Dr. Raymond Pearl.

(Continued from last Issue).

Having now considered adult mortality as an index of general vitality and constitutional vigor attention may next be turned to the records of the hatching quality of eggs and the mortality of chicks. It needs but little practical acquaintance with poultry for anyone to recognize that in these two things exists one of the most precise measures of the general vitality or constitutional vigor of a strain or flock that it is possible to get. If a relatively large percentage of eggs hatch, and the chickens are strong and vigorous, and only a small proportion of them die it puts the question of the vitality of the stock beyond cavil.

It would be highly desirable if records could be presented for the hatching of eggs and the mortality of chicks during the whole period covered by the mass selection experiment. Unfortunately it is impossible to do this since no such records were kept prior to the hatching season of 1908 (laying year 1907-08). Data on these points have been kept since that time, however. The figures for the hatching seasons of 1908 and 1909 have already been published. For comparison with these, and to serve as a basis for a discussion of the present condition of the stock, in respect to these matters and in relation to the method of breeding now being followed, similar data will be given here for the hatching season of 1911 (laying year 1910-11).

Tables B and C give the hatching records for the season of 1911 for birds belonging respectively to high and low fecundity lines. All of the birds in Table B belong to pedigree lines of which the mean winter egg production of all females for four generations has been high. These are the birds used in 1911 to propagate the "high lines," the egg production of which is discussed further on. All of the birds in Table C belong to pedigree lines in which the mean winter egg production has been uniformly low for four generations. The females in the two tables represent of course only a part of all birds bred in 1911, but they are the only ones whose hatching records are pertinent to the present discussion. Cross-bred birds and Barred Rocks in other lines of experimentation do not concern us here. As a matter of fact, the averages of Table B represent about the average hatching and rearing record of all birds bred in 1911. Some groups of birds did conspicuously better, especially on the rearing records.

— Table B. —

Hatching Records of Barred Rock Females of High Fecundity Lines.

Season of 1911.

Hen. No.	Eggs Set.	Per cent. infertile.	Per cent. fertile eggs hatched.	Per cent. chicks died in 3 weeks.
4	43	4	63	11
9	57	17	59	10
10	69	28	53	3
11	18	27	53	
12	60	3	82	12
14	64	21	84	7
18	43	16	5	
19	48	6	71	6
20	45	2	45	15
22	38	10	5	50
25	53	13	47	9
27	57	33	34	
28	45	8	60	8
29	53	16	65	10
36	47	8	74	12
39	43	18	5	
41	51		39	
46	40	75	40	25
53	52	40	48	20
76	46	15	79	12
77	34	97		
81	37	8	79	3
85	56	26	31	15
117	50	8	71	15
134	50	56	18	
165	38	7	68	4
196	42	23	62	25
198	46	10	41	17
273	16	47	66	6
1148	35	5	87	6
1156	37	35	41	40
1169	42	14	30	18
1170	40	0	87	5
1191	51	3	46	56
1196	42	11	81	
1203	40	12	54	21
1213	48	6	53	41
1225	40	15	26	22
1232	39	2	63	16
1255	21	47	36	
1256	42	7	71	7
	*1886	19	55	12

*Totals and weighted averages.

— Table C. —

Hatching Records Barred Rock Females of Low Fecundity Lines.

Season of 1911.

Hen. No.	Eggs Set.	Per cent. infertile.	Per cent. fertile eggs hatched.	Per cent. chicks died in 3 weeks.
3	27	3	42	9
34	39	5	54	10
45	29	44	55	20
55	53	67	23	25
56	55	7	37	5
118	43		48	...19
142	38	5	36	7
188	69	2	64	
221	57	21	20	33
232	68	13	45	11
249	32	15	48	23
430	53	64	89	17
477	38	2	32	8
479	54	20	58	32
481	59	3	57	9
546	48	31	18	16
1221	43	6	42	29
1238	49	8	51	30
	*874	18	46	15

*Totals and weighted averages.

To be Continued.

Errors, like straw, upon the surface flow,
He who would search for pearls, must dive below.
—Dryden.

Poultry Diseases.

— Bumble Foot. —

Symptoms: The ball of the foot becomes enlarged, inflamed and quite hot. The bird is lame; frequently stands on one foot, and suffers considerable pain from the inflammation.

Causes: Jumping down from a high roost on to hard ground. Injury to the bottom of the foot caused by a sharp substance.

Treatment: With a clean, sharp penknife make an X cut on the bottom of the foot. With the thumb and pen-knife squeeze and scrape off all the matter in the abscess and thoroughly wash out the interior with a weak solution. Wrap the foot with muslin, so as to keep out any dirt, and place the bird in a coop on clean straw. Feed bread and milk, boiled eggs and cooked meat for a few days. The sore will heal, and the bird should be well inside a week. If the roost is high, lower it, or remove the cause of the disease to prevent its recurrence.

— Canker. —

Symptoms: Yellow matter of a "cheesy" appearance atached to the membrane of the throat, windpipe or eyes. Offensive odour. If the canker affects the windpipe, the bird breathes heavily and often wheezes. This disease is similar to diphtheria in persons.

Causes: Keeping the fowl in a poorly ventilated, damp house. The disease is contagious, so that one case can spread the trouble through an entire flock. It is frequently contracted by overcrowding, unsanitary conditions and bad methods of feeding.

Treatment: Separate the diseased bird or birds from the remainder. Place them in airy coops. Colour the drinking water of all fowls pink with permanganate of potash. Remove litter and put in fresh straw; whitewash the house and spray a weak carbolic solution over the birds on the roost. This should kill the germs and prevent more fowls being afflicted. To treat the sick birds in the airy coops, whittle a spoon-shaped stick about ¼ in. wide by 6 in. long, and remove every particle of the cheesy matter from the throats of the birds. The membrane will bleed, but that does not matter; get rid of the yellow stuff or you cannot cure the bird. When this is off, take a clean feather, dip in peroxide of hydrogen,or a 40 per cent. solution of silver nitrate, or perchloride of iron (any of the above remedies are excellent), and then touch every portion of membrane where the cheesy matter was attached. This first application, when thoroughly applied, will just about clean out the canker. Repeat it, if necessary, or until the throat regains its natural condition.

When the cankerous growth attaches itself to the inside of the windpipe, the case is much more serious; and, in fact, it is doubtful if you can cure the bird. Remove all the web from a feather, except for an inch from the tip, and after dipping the tip in the medicine twist around in the windpipe where the growth is. I don't think anyone has been successful in scraping off a growth of canker inside the windpipe. It is attached so firmly that before it is removed, the bird is almost certain to be suffocated. As long as the disease does not enter the windpipe it is easily cured.

— Cropbound or Pendulous Crop. —

Symptoms: All cropbound birds have not loose, pendulous crops, as the latter condition is frequently caused by over-feeding sloppy mashes or soft food. When a bird has no appetite and its crop continues filled for some time, this trouble is usually the cause. There is generally a sour smell when the mouth is opened and the crop squeezed.

Causes: Over-feeding soft mashes. Feeding an excessive amount of coarse ground oats, or other food with a great percentage of hull. The introduction of decomposed or poisonous matter into the crop. Eating particles of mineral or vegetable matter that cannot pass from the crop.

Treatment: Treatment by inserting the tube of an old-fashioned syringe directly into the crop and filling it several times with warm water, each time inverting the bird's head and working out all the matter possible from the crop, and continuing the douches until the crop is clean, is the best way to cure this disease. Afterward, feed the bird on sofe foods sprinkled with charcoal.

When the opening from the crop is filled with hulls, dried vegetable matter or stones and sticks, as is some times the case, the crop must be opened and the obstruction removed. Separate the feathers of the breast immediately over the crop; make an inch and a half cut through the outside skin, and a small cut through the membrane of the crop. Carefully remove all the matter in the crop with a buttonhook, and douche it out with the syringe. Then examine the crop carefully and if the lower opening is stopped try and pull out with the buttonhook or nnger any substance lodged therein. Then wash the crop again. Add a little Condy's or carbolic acid to all these douohes in order to kill any germs in the water, and to disinfect the interior. Feed the bird on well-cooked nutritious food, keeping it on clean straw, and it is not necessary to sew up the openings.

Egg Bound.

Symptoms: The pullet or hen goes frequently to the nest, but does not lay. She appears to be in trouble. As the case proceeds, her wings and tail droop and she is hardly able to walk. By feeling the lower part of the body a hard substance (the egg) can often be detected. Insert a clean pencil and the egg can be tapped.

Causes: Pullets are frequently egg bound with the first egg they lay. It is natural for the first egg to be small, but sometimes it is extra large and trouble results. An overfat condition of the hen resulting in weakened muscles. Trying to pass a soft-shelled egg against which normal pressure cannot be exerted.

Treatment: Insert a pencil or an oiled finger, to make certain that the egg is in the passage. Hold the hen's legs far apart and tap the egg quickly with the pencil, so as to loosen it from its position. The hen will almost always pass it at once. If not, give her a dessertspoonful of castor oil, and with a medicine dropper inject sweet oil into the egg passage. After three hours, tap the egg again.

Holding the hen over hot water to steam the parts is thought by some to help the case, but it did not seem to do any good in our experience.

A serious phase of this trouble is when the egg is broken inside the hen, either from her own efforts to expel it, or from injury. Oil the egg passage with sweet oil as recommended, and insert an oiled finger as far as possible, in the hope of reaching the skin or shell of the egg. Usually the shell is passed with the broken white and yolk, but invariably the membrane or skin inside the shell remains in the passage. On account of the irritation it produces, the hen continues to strain to get rid of it. But this is practically impossible, and unless you are able to reach this skin and remove it, she is certain to die.

Breeds of Poultry.

— The Spanish. —

Though it is not likely that this fine old breed will ever again become popular, for the cockerels especially are sad and solemn looking customers (the sadness is perhaps due to the fact that it bears a name to which it has no particular right), whilst their sisters seem to have devoted themselves to the size rather than the number of eggs laid, the older generation of poultry breeders at any rate will have some kindly remembrance of this old favourite. The following interesting notes of its origin and history are by Mr. Edward Brown, who writes:—

For a long period of time this breed of fowl was regarded as the representative of Spanish poultry, but the result of our inquiries and observations is to show that it is unknown in Spain, except in the hands of breeders who have imported specimens. That it is of the same family as the Castilian and Minorca races we have no doubt whatever; but the evolution has been considerable since leaving its native land, and its leading feature—the white face—has been developed at a later period.

Many suggestions have been put forward as to the origin of this fowl. Mr. Harrison Weir says that it "might possibly be the breed alluded to by Columella as having large white ears, and more given to laying than sitting and bringing up their young"; but that ancient writer, so far as we know, does not refer to white on the face, and his remarks would equally apply to the Leghorn or Italian fowl and to the Castilian. Probably the fowl referred to by Columella was the progenitor of all these breeds, which were conveyed along the Mediterranean shores into France, and across the Gulf of Lyons into Spain, there to assume the different forms we now know.

In the earlier works on poultry the name Spanish is given to fowls which had no relationship with the present-day breed. Dickson confounds it with a crested race related to the Polish, and speaks of "a black tuft that covers the ears," and says it had broad round black spots on the breast, the rest of the body being velvety brown. And Dixon, a dozen years later, refers to birds imported from Spain in 1846 which were "in shape and carriage very much like the Spangled Polish (except being much longer in the leg) having topknots and a tuft of feathers hanging under the throats"; but, as he says, the recognised Spanish at that time were entirely black, with white faces. Moubray, however, early in the century, speaks of them as "all black, black legs, large red comb and gills," but does not mention the white face. In the crude illustrations accompanying his work that feature is distinctly represented. Don Salvador Castello says: "This (the White Faced Spanish) is an extremely rare breed, upon whose origin it is difficult to give an opinion. It appears in all foreign works as a Spanish breed, and naturalists in old days seem to have been under the same impression when they baptised it Gallus hispaniensis. . . . Some say that before the discovery of America the breed existed in Spain, and the fact that it is found in Cuba and certain republics of South America has given reason to suppose that the Spaniards exported them there. Everything is possible, but it is very curious that there is no trace of this breed either in drawings or in histories."

In our own country Spanish chickens are produced almost entirely in the spring and summer, as the fowls cannot be depended on for winter laying. Chickens should not be hatched early —not before May—as they are long in feathering, and do not seem able to withstand cold, more especially east winds. The old birds also are slow in moulting, and sometimes may be seen almost entirely denuded of feathers. At all ages they are tender and soft; and even when the race was bred on more sensible lines they could not be regarded as hardy. But we have known cases where they were hardened by roosting in the trees throughout the autumn, and the result was a great enhancement of natural vigour. Unfortunately, the tendency of weakness has been increased by the fact that Spanish are almost exclusively kept and bred in confinement, in order to protect the purity of white on the face. Practical poultry breeders, if they desire to keep Spanish, should select the smaller-faced birds, and rear as naturally as possible.

The Spanish is a small bodied fowl, of medium length, and full behind; the neck is long and fine, surrounded with a large, broad head, upon which is a deeply serrated, tall comb, fitting close to the neck at the back; the wattles are correspondingly long; as already mentioned, the great feature is the white face, which in exhibition specimens not only completely surrounds the eye, but extends well behind, and joining with the earlobe, hangs down lower even than the wattles. The skin is like the finest kid in texture, perfectly free from folds, but the smoothness is only secured by plucking the small black hairs which appear naturally. The smaller-faced birds are hardier, and, in our judgment, look better, as large faces are abnormal in appearance; the legs are long, giving a "reachy" carriage; the plumage is rather scanty, fitting close to the body, and the wings short and carried close, whilst the tail is of medium fulness, with large sickles in the male; the plumage is black throughout, with a rather dull sheen; the beak dark horn, and the legs dark slate. Weight—males, 6 to 7 lbs.; females, 5 to 6 lbs.

The Competition

Lessons and Limitations

The round of competitions just completed has been fruitful of results, some of them interesting and satisfactory in themselves, others which, emphasizing the lessons of the past, are very suggestive to those who have thoughtfully followed these yearly tests.

It would be idle to deny that these latter are not only more important than those which will receive much greater general attention, or that they are extremely unsatisfactory, indicating, as they do, on how insecure a foundation the much-talked-of advance in poultry-breeding is built. We refer, of course, to the absence of any evidence of consistent advance in general averages, but rather the reverse, and to the fact that each successive year shows more clearly that those whom the poultry world have been accustomed to regard as clever breeders, who were able to largely control success, have really been more indebted to luck than good management. In the racing world such in-and-out running as that shown by competitors would be put down to the fact that the stable knew a bit too much; in this case it is evident that it is because the owner knows a bit, and a good big bit—too little!

THE LAST POST.

This year, for the first time in competition history, a pen of six pullets has passed the sixteen hundredth mark. There will probably be some disposition to question the justice of placing this record on the same footing as those established at Subiaco, Roseworthy, Gatton, and elsewhere, because the conditions of housing were somewhat different. It appears reasonable that any record put up under natural conditions should be eligible for comparison with any other also put up under equally natural conditions. The point of interest is: What is the greatest number of eggs six pullets can be persuaded to produce—and it does not greatly matter whether they wear spats and mufflers in New Zealand, or sun-bonnets and open-work stockings at Gatton.

Natural conditions is an elastic term. To live in a house and lay in a foot warmer; or roost in a tree, and lay in an ice-chest may be equally natural to a self-respecting hen; it just depends on where she happens to be.

The equity of comparison is, in fact, easily demonstrated thus: It is natural, it is even wise, we are told, to come in out of the wet. It is obviously even more natural to stop in out of the wet. It is, we are further told, always raining in New Zealand, whereas it quite frequently is not in Australia. Therefore, continuous housing is natural in New Zealand, and the dis-continuous variety in Australia.

Now, as Euclid once casually remarked, any two things which are equal to the same thing, are equal to one another, and the results may, therefore, be quite legitimately compared—Q.E.D. So the world's laying championship goes to New Zealand, and it is fairly safe to prophesy it will be some time before it comes back again.

The honour of possessing the celebrated six belongs to Mr. Nixon, of Papanui, the exact score being 1,614 in 51 weeks, and the scene of action Papanui, New Zealand.

We do not recollect that Mr. Nixon, or rather his birds, have ever in previous tests publicly shown premonitory symptoms of so striking a performance. Nor have we any means of knowing whether he himself, his pullets, or an admiring public, are most surprised at its accomplishment. It is, perhaps, gratifying to know that South Australia still has a faint and far-away lost-to-sight-to-memory-dear kind of interest in the record, for we hear that at more or less recent dates Messrs. Brooks, Padman, and Kinnear have sent over birds, some, all, or quite possibly none of which may, under the guiding hand of the Goddess of Fortune, have had a say in the composition of the record-holders.

THE LAY OF THE UP-TO-DATE ORPINGTON.

From Gatton comes the very welcome news that a pen of Black Orpingtons have topped the 1,500 mark, this being the first time that any breed other than White Leghorn has done so.

It will add to the pleasure of all breeders of this Black, to know that, judging by reports, the birds under notice, are really Black Orpingtons, and not black fowls masquerading under that title. They are said to be weighty, typy fowls, and to lay eggs which are well above the danger line. Though one swallow does not make a summer, the fact that birds of this stamp have put up so fine a score goes some way to show that the generally-accepted belief that the Black Orpington is not suited to warm country, and that a big bird is by reason of its bigness, ruled out of court as a layer is not in accordance with fact.

In South Australia the Black Orpington has practically passed out of existence as a candidate for competition honours, but this win should certainly encourage breeders to take heart again. It is not easy to determine the cause of the little progress made by the breed here. One breeder did, indeed, gravely inform us that his birds had utterly worn themselves out in practising the shrill crow, the high kick, and the grave-digging propensities considered by certain wise men so essential items in the make-up of the modern Leghorn. It will be interesting to know whether the Queensland winners showed any marked proficiency in these strenuous exercises—we must enquire.

ROSEWORTHY.

There is little of interest to report from Roseworthy. It is certainly very discouraging that the top score should be considerably below what has on several previous occasions been accomplished, though the past winners' brigade was strongly represented—even more disquieting is the drop in general averages. That there were no sensational or even high scores is not, perhaps, important, but the fact that the rank and file show no improvement can hardly be so regarded.

The argument that this lower average, being from a somewhat greater number, makes it equal to anything done in the past, is not, we think, sound. The possible lowering influence of pens entered by new and inexperienced breeders should be more than counterbalanced by the greater knowledge and longer opportunity for selection which each passing year brings to competitors; that is, if there is, indeed, anything in this theory which anyone who studies competi-

tion returns may be excused for seriously doubting.

SECTION C.

This section when first arranged appeared to us to be a somewhat limp proposition. Commercial poultry-keeping, which alone is of interest as a State concern, will, we believe, tend more and more towards one of two essentially different methods of working, the open range on cheap land and permanent housing on dear land. The half-and-half system of Section C. does not appear to get much forwarder in any direction. Had the birds been confined throughout the year they might have demonstrated something of importance, even if they did it by dying. As it is, the result seems to be quite negative, for the figures cannot be said to support the belief that winter housing is of any value any more than that they show that such treatment is in any way directly or indirectly prejudicial to health or to egg production. One point, indeed, is brought home to breeders, and that is how important it is, not only that experimental work should be done, but that it should be conducted on such a scale as to eliminate as far as possible any error in the conclusions arrived at.

EXPERIMENTAL WORK.

Private breeders, as a rule, have neither time, cash, or accommodation for experiment. It does not matter how anxious they may be to test certain points, or how great their belief of the importance of such knowledge in their work as breeders, they simply cannot undertake it, or if they do it can only be on so small a scale that results may be quite misleading. It is evident that had each of the ten breeders in Section C at Roseworthy conducted a separate experiment with the birds they sent up some would have been justified in thinking that winter housing was a great success; others that it was disastrous, and the balance that there was nothing in it one way or the other.

Possibly, but not probably, this last is the correct solution; at all events the case is by no means proven. It is extremely unlikely that so comparatively drastic a difference in treatment can have had no effect, and the fact that this is not shown in the average result is doubtless due to disturbing factors which may not be known or guessed, but which, as everyone who has followed experimental work knows, may exercise so great an influence on results of tests planned on so meagre a scale as the one under notice, as to render them quite valueless. It is for this reason that we have repeatedly and earnestly urged that the opportunity offered by the competitions in this regard should not be neglected. We might certainly have saved ourselves the labour, and we do, indeed, trust that nothing we have ever written in the interests of experiment can be held to be remotely responsible for the Parafield Section C, in which the Powers That Be are apparently seeking to discover what effect a man's occupation has on the laying the birds he send up. Section C at Roseworthy was at least a feeble effort in the right direction.

P.S.—It is rumored that the Plumbers' Union will, through the W.L.U., agitate for a section on their own account at the next competition. As they justly contend Plumber and Pastoralist begin with the same letter. and they indignantly ask why the latter should be so signally favoured.

Sargenfri Poultry Yards.

As stated in his advertisement in this issue, Mr. C. J. Chandler specializes in White Leghorns. He has, in fact, cleared out all other breeds, and has done so because he has found that, apart altogether from the sale of breeding stock and eggs for hatching, the breed he has thus pinned his faith to is an "all-the-time" profitable proposition from the market egg point of view. When we remember the reputation and selling qualities of the stock thus discarded we can the better recognise the compliment paid to the White Leghorn, Mr. Chandler tells us that he is more than ever convinced of the value of single testing, and that this is to be carried out even more thoroughly than in the past. He further tells us that he has put up an additional 25 pens, making 60 in all—this extension being rendered necessary by the rapidly growing trade in Sargenfri stock. We do not feel at liberty to mention figures, but we can assure readers that they will be well advised to place any orders they may contemplate sending at an early date, for large as was last season's hatching total, orders already executed and in hand have made serious inroads on it. The performance of the Sargenfri birds at the last Roseworthy test, where, it will be remembered, they ran second, was a creditable performance. Writing from memory, we should say that the Sargenfri strain was one of the small company which have made consistent progress. They have never, it is true, "gone up like a rocket;" on the other hand, they have never illustrated the remainder of the quotation. Mr. Hart, when over here recently, told us that he was particularly pleased with the Sargenfri birds. "The best lot I have seen this trip," was what he said, and we believe he backed his opinion by buying for Victorian breeders. Praise from this quarter is praise indeed; it is not easily earned, or bestowed without reason.

Parafield Laying Competition

Commenced April 1st, 1913.

The birds sent up to Parafield seem to be settling down steadily to their work. At the end of the third week the leading pens in each division had scored as follows :—

— Section I. —

For common or garden poultrymen.

Moritz Bros.	64
Padman, A. H.	63
Hagges, W. H.	57

— Section II. —

For Pastoral and sundry agricultural poultrymen.

Carling, R.	60
Carling, Mrs. R.	57
Packham, C.	54

— Section III. —

For Heavy Breeds. Trade or profession of owner apparently considered to be immaterial—

Kenway, D.	84
Padman, J. E.	52
Dunn, L. F.	46

"Of very great value" was the reply of a famous English Physician, when questioned as to the benefit, or otherwise, of brandy as a stimulant, but he continued, "it must be taken with discretion and special care exercised that, only matured and approved quality be used." As meeting these requirements the "Curlew" brand, of which Messrs. Downer & Co. are agents, is well-known, and those who have used it have found it to be helpful in case of sickness, and a pleasant and refreshing stimulant at all times.

Home Notes.

Our Boys.

(By a Country Woman).

Here is a toast to The Boy. "May his shadow never grow less," and, as the Arabs say, "May his tribe increase." There is not a more healthy and promising proposition in the world than the Australian boy. And there are thousands of him abroad in this fair land of ours, and room for every one. The cities and towns are reaching out their gaunt, smoky arms to him, enticing him in a thousand ways, most of which, we may add, are deceptive; but the country wants him most.

The Boy is our nation's hope; but what is he going to do with himself? What is he going to make of himself? He is never happy unless he is doing something, and we say, "Hurah for the boy who does the right things—things that tell!" City factories and city wiles stand ready to swallow him, body and soul, if he will allow himself to be sucked into their streams. Boys and young men are wanted everywhere. The temptation too often is to go away from home without thorough preparation, and to compete with the unskilled labour that earns only a living wage. Hundreds of bright boys drop out of sight every year and are never heard of again. A few, by careful, connected preparation and earnest work make a name and gain recognition. Of these, some are a benefit to the world.

The farm boy more than any other is the type of vigorous young manhood, because he is a thinker. The reason why he is a thinker is a double one. First, he usually has a good body, and a good body is essential to the work of the mind. Second. he has had the advantage of a peculiar mind discipline and training from the very beginning of his life. His reasoning faculties were harnessed and stirred to activity at the cradle, as is not possible in any other walk in life. All the work of the household, interwoven as its interests are with the work of the farm, he witnessed. He early learned the dignity of labour and why it is needful, and as early began to inquire into the logic of things. Why was wood brought in? Where did it come from? Why was it put in the fire? What were those things that came out of the cellar? Why were some things put there and others in the sheds. Why were their positions never reversed? Later, why did seeds go into the ground, and sprout and grow? What is the origin of plant and animal life and why are all so different? And a thousand other questions. All this was study as much as if books were in use. Valuable education was begun.

Now this young thinking machine is older and the towns and trades want him; but so also does the wonderful, twentieth-century agriculture. Many a boy has not decided yet what he will follow—has not found himself, so to speak. Many a boy has not thought what he is specially adapted to. And it is a good scheme not to be in too much of a hurry about it No good business man makes an important move without carefully maturing his plans. So, boys, think very carefully before you leave home and country life.

We never say fail. There is no such word in our dictionary. —Longfellow.

Feeding Value and Flavour of Nuts.

The term "nut" is not a definite one—botanically speaking—but is applied indiscriminately to a variety of certain fruits, or parts of fruits, and implies a more or less hard, woody covering, surrounding a meat or kernel. The fact that nuts form a concentrated class of food-stuffs, owing to their general richness in fats and proteins—the two most valuable of nutritive constituents—is very evident from the analysis of a large number of different kinds. Oil or fat is very commonly a prominent constituent of nuts. The Brazil nut contains 65 per cent. of fat, the walnut 60.7 per cent., the cocoanut 56.2, the almond 54.4, and the ground nut 43.5 per cent.

Several of the above, as well as others, are also rich in protein or albuminous matter—that constituent of foods which goes to form muscles or red meat in the animal body. The almond contains 21 per cent., the walnut 18 per cent., the Brazil nut 17 per cent. of protein.

Only a few of the commonly used nuts contain a large proportion of carbohydrate matter. Among these the dry chestnut, with 73.0 per cent., ranks highest.

When it is considered that the proportion of protein in an average beef steak comprises 19.8 per cent., and of fat 13.6 per cent., that in Cheddar cheese the protein percentage may be taken as 27.7 and the fat percentage as 36.8, and that boiled eggs contain 12.4 per cent. of albuminoid matter and 10.7 per cent. of fat, it will be seen that the food value of nuts, as deduced from their percentage composition of nutritive matters, is, gene-

rally speaking, a high one. This food value is somewhat depreciated on account of the fact that the nutritive constituents, more especially the protein matter, are not so easily digested as the corresponding constituents of meat, but this inferior digestibility is to a large extent, due to imperfect mastication of the nuts.

The flavour of nuts is to a large extent due to the oils present, though in some kinds there are also certain specific flavouring bodies. The nut oils readily become rancid, and the disagreeable flavour of spoiled nuts is due to this property.

The almond possesses a hydrocyanic acid flavour, which is characteristic of the kernels of peach stones, plum stones, &c., and this might be expected when it is remembered that the almond is the dried kenrel of an inedible fruit, which somewhat resembles the peach in appearance, and is closely related to it botanically. Most almonds are mild-flavoured, though in the so-called bitter almonds the glucoside which yields the cyanic acid is more abundant.

Variety in Diet.

Variety has been well described as the salt of life, and there is no question that nine-tenths of the women who break down and suffer from what the doctors call "nervous debility" are really the victims of want of variety. Although much good advice is given concerning the advantages of systematic arrangements in regard to the daily work, and every detail of the home life, we must not overlook the equal advantages of variety in many departments of the home.

The housewife, in the routine of four meals a day, and the necessary washing, baking, and sweeping, incident to the running of a well-regulated household, thinks perhaps that the element of surprise should not be introduced into the clock-work system, lest confusion be the result. Here is just where the mistake lies, for in the endeavour to secure perfection of detail, affairs get into a rut, and order becomes both monotonous and tiresome. The family does not like to feel that on Wednesday it will sit down to boiled beef as surely as it will dine on roast mutton on Sunday.

Only the other day we heard a wife say to her husband, "What shall I get for dinner?" and the reply came straight from the man's heart: "I don't care, so long as I do not know what it is going to be." This sentiment is universal. Vary the daily menu, and likewise vary the arrangement of your rooms. Of course, it will be best to enter into the new regime with moderation and good sense, or the desire to produce a surprise may result in something not so agreeable as anticipated. Do not throw the house into confusion every day in order to obtain a new arrangement in furnishings, and do not eschew entirely the sensible meals well served that have hitherto been the standby in your daily menu, but contrive onec in a while to strike the keynote of variety, for it is likewise the keynote of domestic harmony

For Plain Women

Remember that there is nothing draws so much atention to lack of beauty as over dressing and the wearing of gaudy colours. Study what suits your complexion, your colouring, and your figure, and avoid going to extremes. Details are of the utmost importance to the plain woman. Neat shoes, neat gloves, tidy collar, and waistbands and well dressed hair will do much to add to her general appearance. Take time over dressing, remembering that while a pretty woman may be careless in the matter of clothes, it is most important that her plain sister should make the most of her good points.

The woman who aims at dainty perfection will soon discover that nothing is more attractive than white, well shaped hands, with tapering fingers and well kept nails. To achieve this end she will have to devote at least half an hour every day to tending her hands, rubbing softening creams and polishing her nails. Ink and other stains are best removed by the application of a little salts of lemon Often a brisk rub with hot water and a soft flannel, but no soap, will achieve the same ends. Don't, if you would have pretty hand,s wash them in too hot water. Don't use cheap, strongly scented soap. Don't cut your nails with ordinary nail scissors; rather file them a pretty oval shape And don't wear too tight gloves.

Give Your Wife an Allowance.

— A Word to Young Men. —

Take the advice of an old lady and never, never marry until you find a girl you can trust with everything, even some of your precious money. Promise this and stick to it all your life (and your reward shall be great). If you earn a pound a week, see to it that she shall have part of it for herself without asking for it.

Put yourself in her place. How would you feel to have your pay or allowance stopped because you married the girl you loved best and be obliged to ask—sometimes beg, and often do without, because you dreaded to ask for money. I know of some women who have been married 40 or 50 years, that have worked hard and never had a shilling without asking for it, and they had good pay or liberal allowances before marriage. They did not marry stingy men, but merely men who did not think of the wife's position. They expect to be asked for money when it is wanted, and want to know what it is for, as though they could not trust the old wife even now, after all these years of labour and love.

One said she knew John was willing and expected her to use all she needed, but she couldn't ask, she felt like a beggar, so she did without. And her dress and home showed she told the truth, too. Is she the only one who reads these lines who cannot say: "Please, sir, give me a penny that belongs to me?"

Girls, until men learn better, work a few years longer before you keep house. Lay up a little to call your own. Men forget all too soon the worth of a wife—or until they pay a housekeeper after you are gone. It isn't nice to wish you were working out again, and had half a crown to buy John a birthday present. Let the young man wait; or, better still, cut this out and keep it, and in a business-like and affectionate way get him to read it and agree to give you a small allowance, according to his means, all for yourself. But do not spend it all. Oh, no; that would not be wise. It will be much better to save part of it by having a savings bank account. You never know how very welcome the little reserve may be should a time of trial come.

Bacon Wanted.

The Englishman evidently enjoys his breakfast bacon, anyway, he consumes several million pounds worth per annum. Being occasionally a somewhat far sighted sort of individual and finding that his present sources of supply are not inexhaustable, he is, through the British Dairy Farmers' Association, inviting the pig breeders of the Empire to send him samples of what they can provide in the way of a really tasty bit of bacon, such as his stomach loveth. The invitation takes the form of a trophy offered at the next Dairy Show, to be held at the Royal Agricultural Hall, London, in October next.

In view of the enormous requirements of the trade, and the fact that as far as can be foreseen the demand will be regular, continuous, and in all probability largely increasing, the suggestion made by the S.A. Commissioner in London, that local producers should be encouraged to compete is obviously a wise one. With this end in view the Government have decided to pay the expenses of preparation, including, presumably, freight charges, etc., for any producer who may desire to compete. Each exhibit, it should be mentioned, is to consist of two sides smoked and two sides pale cured. Full particulars are, however, available from the Produce Department.

Holden and Frost.

Warmth in animal life is produced and maintained at the expense of food consumed, keeping animals warm, therefore, means a saving of food, and in the case of dairy cows, an increase of production just as assuredly as keeping them cold means an increase of food, and a decrease of production. It has been demonstrated by the experience of many dairymen, in this and other States, that rugging is the most effective and cheapest system to protect cattle from the chilling winds and driving rains of winter. With rugs cows are always warm. Not only does rugging lead to the maintenance of a high standard of production during the cold weather, but the animal so protected does not waste time and food in getting into the high condition which is the maximum yield of which she is necessary before she can produce capable in the more genial months, thus there is a double gain which has been estimated by experienced and practical men at twenty-five per cent. To the unconverted, and, there are unfortunately many of them in the State, we would suggest that they rug half their herd, and compare the performance of those so treated with the other half during the next six months. They will, we believe, be fully satisfied of the very great value of using such rugs as those manufactured and sold at extremely reasonable rates by Messrs. Holden and Frost, of Grenfell Street, Adelaide.

In the Saddlery department one finds an extensive collection of saddles of all shapes, sizes, and qualities—one of the most popular saddles is the well-known "Beaufort," which is a great favourite for station work, the design is such that the saddle is light on horse and rider alike, and affords a cool and comfortable seat; they are made in various weights from eighteen pounds up, and may be had either in pigskin or bullock hide, and in color from Bismark brown to yellow. The Winnecke is a heavier type, weighing up to twenty-one pounds; it is equipped with roll cantle, giving a springing, floating seat with high solid knee pads, and Queensland pannel. The tree is strengthened by galvanized plates. Harness of all descriptions for town, station and farm use is stocked, ranging the dainty tandem outfit to the solid, practically indestructable harness necessary for the heaviest trolly work. In this department a type of harness, which is rapidly making its way as "just the thing" for the purpose, is the "Orchard" Harness, designed and used by Mr. Wicks, of Balhannah, particulars of which Messrs. Holden and Frost, have recently brought to the notice of our readers. The advantages of the use of this harness for all classes of orchard work are so obvious, that to see a team at work, is quite sufficient to convert those who have not tried it, to a full appreciation of its stirling merit. Tarpaulins and all classes of canvas, and waterproofing are also a feature of this extensive warehouse and factory.

Tried Recipes.

— Marmalade Pudding. —

Take the weight of two eggs in sugar and in butter, two and a half ounces of flour, a teaspoonful of baking powder, two eggs, and two tablespoonfuls of marmalade. Beat the butter and sugar into a cream; add the flour mixed with the baking powder; then the well beaten yolks of eggs and a tablespoonful of marmalade. Lastly add the well whisked whites of eggs. Place all in a buttered mould, and steam for one and a half hours. To serve, turn out, place a spoonful of warmed marmalade on the pudding, and pour a good sweet sauce round.

— Coffee Custard. —

A very rich and delicious compound is made by using a pint of milk, half a pint of rich cream, and half a pint of very strong coffee as the basis of the custard instead of a quart of milk. Orange and lemon custards may be made be first making a syrup, boiling half a cupful of sugar with a very little water, then adding the rind and juice of a lemon or an orange; let it boil up, and strain it. Use this syrup instead of sugar, adding it last, and bake immediately.

— Vegetable pie. —

To make vegetable pie, prepare as follows: — Take cold vegetables left over from Sunday dinner, say, potatoes, ma(row, egg fruit, beans or other kinds; mince up and season with pepper and salt. Take pie-dish or baking-pan, put in sufficient beef dripping or bacon fat to grease well. Put in vegetables. Press down with knife. Place several rashers of bacon or ham on top. Put in oven, and let remain till bacon is cooked, by which time the whole will be nice and hot. Take out and serve. This is a very tasty dish, and will be sure to please when once tried.

— A Good Soup. —

A very economic soup may be provided by trimming away the bone from the joint, smash up with cleaver, and place in saucepan, with 2 quarts water. Prepare three onions, the tops of one cut small; a little finely-chouped parsley, pepper, and salt to taste. Throw into saucepan, and when boiling draw to side of stove, and let simmer three-quarters of an hour. Mix tablespoonful fine oatmeal with little water, and stir in. (Cornflour or rolled oats may be used). Let remain 15 minutes, then serve. When vegetables are plentiful soup should be a standing dish. It is far better for children than all solid food.

— Cheese Salad. —

Put ½ lb. good cheese, cut thin, into a saucepan with 1 oz. butter, and stir over the fire until it is thoroughly well melted. Remove the saucepan, and add 2 eggs, lightly whisked; mix all together, add 2 tablespoonfuls cooked rice, pepper and salt to taste. Put into a shallow tin, and brown before the fire.

— Apple Gateau. —

Boil one pound of loaf sugar in half a pint of water till it makes a rich syrup. Peel, core, and slice very thinly two pounds of any nicely-flavoured apples which will fall easily. Boil in the syrup with the rind and juice of a lemon until stiff. Pour the mixture into a mould, and the following day turn it out and serve with custard.

— Suet Crust. —

Whether boiled, baked or steamed, suet crust is more wholesome than that made from butter or lard. The proportion of suet need not be more than 6 ozs. to the pound of flour. It must be very finely minced and free from all skin. A pinch of salt and sufficient cold water to make a pliable paste is all that is required.

— Hot Milk Rolls. —

Mix well two and a half spoonfuls of baking powder with 1 lb. flour and teaspoonful of salt. Rub in 2½ ozs. butter lightly, make a hole in the middle, and slowly stir in half a pint of milk. Stir briskly, turn out on a well-floured board. Roll into a long, thin roll, or shape into buns. Put on a baking tin and bake in a fairly quick oven. When they begin to brown smear them over with milk, finish, and serve hot in a folded serviette.

— Beef Biscuits. —

This is a toothsome way of using up cold beef. Mince one pound of cold roast beef, the leaner the better, very fine; add pepper, salt, a few savory, herbs, chopped small, and half a teaspoonful of minced lemon peel mix all together with half the weight of the beef in crumbs. Bind it with two eggs into a thick paste; form into balls; dip them in white of eggs and bread crumbs, and fry them a rich brown. Serve with a garnish of fried parsley, and with a brown gravy in a tureen, or without the parsley, round the rissoles on the dish.

— Sherry Cake. —

Four ozs. butter, 8 ozs. flour, three eggs, grated rind of one lemon, 5 ozs. caster sugar, one teaspoonful baking powder, one tablespoonful milk, 4 ozs. glace cherries. Sift the flour and baking powder together on to a sheet of paper. Cream the butter and sugar together until they are white, beat in the eggs one at a time, then add the flour, grated lemon rind, milk, and cherries cut in quarters. Put the mixture in a tin lined with buttered paper, and bake in a moderate oven for about one and a quarter hours.

— Almond Puffs. —

Half a pound ground almonds, 1 oz. rice flour, rice paper, 1 lb. caster sugar, six whites of eggs, 1 teaspoonful vanilla essence, a few shredded almonds. Put the almonds, caster sugar and whites of eggs into a basin, and cream them well together for ten minutes. Add the rice flour and vanilla essence, then pour the mixture into a bag through a plain paper pipe. Put this out on rice paper in round about the size of a penny, decorate with shredded almonds, and bake in a moderate oven for about twenty minutes.

— Beef Patties. —

To prepare beef or mutton, mince very fine. Boil 12 potataes. When done, drain, dry, and mash them. Take one large onion, minced fine; one egg, well beaten. Add pepper salt, little nutmeg. Mix all well together, and mould with the hands into small patties. Roll in flour. Fry in greased pan until nice brown both sides. Place on dish, and sprinkle little finely-chopped parsley over. Serve very hot. A little gravy or sauce is a great improvement.

— Ham Flavored Rissoles. —

Mash 1 lb. of cold boiled potatoes with 1 oz. of butter, season well with salt and pepper, and add two tablespoonfuls of finely minced veal and ham, or any other cooked meat, a dessertspoonful of tomato sauce; mix to a paste with a well beaten egg. Form into rissoles, dip them in beaten eggs, cover with breadcrumbs, and fry in boiling fat a golden brown; drain very dry, and serve garnished with slices of tomato and chopped parsley.

Editorial Notices.

AGENTS.—Messrs. ATKINSON & CO. and MESSRS. GORDON & GOTCH, Ltd.

The Editor will be pleased to receive correspondence and answer questions. These replies will, for the most part, be sent by mail, unless received just prior to date of publication.

PUBLISHING DATE.—On the 25th of each month preceding title date.

DISCONTINUANCES.—Responsible subscribers will continue to receive this journal until we are notified by letter to discontinue, when all arrears must be paid.

TO ADVERTISERS.—Alteration of advertisements should be in our hands not later than the 15th of the month.

SUBSCRIPTION.—Posted to any part of Australasia 5/- per year, in advance. Foreign, 6/.

ADDRESS—85, Currie St., Adelaide. Telephone, 1234.

Making a Garden.

(By Penrhyn.)

The thorough preparation of the whole garden site, as suggested last month, no doubt entails a good deal of labour or some expense, but as to the former, one may take comfort from the thought that digging is a highly recommended form of exercise, for it strengthens the spine and hardens the muscles — either one's own or someone else's. Probably in this initial preparation, it is wise to allow someone else to enjoy these benefits, and even to pay him a reasonable daily wage into the bargain; for with all its strengthening and hardening virtues, digging is apt to grow monotonous. The cost, in any case, will not be great, and it certainly seems poor policy to spend hundreds in building or buying the best possible house, and then grudge a few pounds in getting the best pos- le surroundings, especially as the er add so greatly to the general ıfort, beauty, and actual value of house. Even from this point of v it is good policy to be reason- r liberal in the making of a new den.

— A General Plan. —

The digging completed, the garden maker can with a clear conscience proceed to carry into effect whatever plans he may have in mind. Just here, it is perhaps wise to emphasize the importance of having a general plan to work by; not, of course, a castiron programme, of the laws of the Medes and Persians variety, which cannot be altered, but still a clear and definite objective. The fault, or perhaps I should say, the failing, with a good many suburban gardeners is that they are too ambitious. They attempt too much in the space at their disposal. There is much of restfulnes and dignity in simplicity of treatment, which is too often overlooked. If the object is to have the greatest possible number and variety of flowers, well and good. If one wishes to have a pretty garden, also well and good; but it must be remembered that one cannot crowd the two ideas into the same small, or even large, space. The ideal garden, from the pretty garden point of view, is, I think, one in which each item is perfect of its kind--but these items are relatively few. Also whilst we should avoid the fault of "too little," we should be even more on our guard against the worse fault of "too much." The habit of the average gardening mind is to buy a plant or many plants, and then consider where they are to go and what occasion or excuse there is for their presence. This seems to be rather putting the cart before the horse. Let us keep this perfection of the few, rather than mediocrity of the many, as a guiding principle in our garden making.

— Features. —

If we call to mind the gardens which have most favourably impressed us in our walks abroad, we shall, I think, find that they possessed some special feature, some dominant note, to centralize and focus attention, or some individuality or originality of treatment. In making a garden, therefore, try to make it yours in capital letters, not just one of a crowd. I am quite aware that this is more easy to write of than to accomplish, but still if we try we shall not, at the worst, wholly fail. Take whichever feature of a well-kept garden you like best—it may be flowering and ornamental shrubs, or lawns, or roses, or beds of brilliant annuals —whichever it may be, make it a feature, make it yours, emphasize it.

— Fixtures. —

In the making of a garden there is a good deal to do which is of a more or less permanent nature. These fixtures, as we may call them, should be carefully thought out. It may, and in many cases, is not necessary to carry one's ideas into effect before making the more temporary plantings which the season of the year may require to be done at once. Under the heading of fixtures will come all or any of the following:—fences, hedges, lawns, paths, arbours, pergolas, arches, screens, rockery, lily pond, specimen trees, the larger shrubs, rose beds; and last, but by no means least, the water service. For larger gardens one might add considerably to the list.

— Favourites. —

Each one has his own favourites, and very various they are, but there are some of our garden friends which seem almost indispensable to me. Common perhaps, but none the less beautiful for that. Virginian creeper we must certainly have, for its soft cool green of summer and its glowing autumnal tints. No human artist could design so gracious a covering for our house walls, or beautify it with such glorious colouring. The small leaved is the neater in its living tracery around window, arch, or cornice, whilst the large leaved is, perhaps, more gorgeous in colouring. A south-east aspect, if it can be managed, will help to lengthen the autumn show. Another favourite house covering of mine is Bignonia Venuesta, for its gloriously abundant orange coloured bloom is a wonderful help in brightening the winter garden. If the fates are kind and one has just the place for a Stephanotis, no other plant should be allowed to usurp it. The Wisteria makes up my quartette for this purpose. One or perhaps both Solanums (Seaforthiana and Welandi) must be added, with, of course, Lapengeria, if one's home is in the Hills, and a sporting risk on the plains; a nurseryman told me once that the odds were 100 to 1 against. Asparagus Plumosa I put high up on the list, with Jacaranda, the Silver tree, the Flame tree, the Judas tree, the white Broom, and beyond all doubt the double flowering Cherry, Peach, or Plum. Another

(Continued on page 580).

Flowers for the Garden.

THE DOUBLE WALLFLOWER.

It is late, but not too late, to begin the cultivation of this charmingly fragrant flower. Seedlings may be bought (many of which will be singles), or seed sown. If the latter it should be done thinly, or else the seedlings become weak and spindly, the great aim being to grow strong, vigorous plants. Prepare the bed in which the seedlings are to be placed some time beforehand by deep digging and rich manuring. When the young seedlings are large enough, put them out in the bed about 12 in. from each other. Give them just enough moisture to keep them growing. When bloming time arrives watch the single flowers for specimens with five or six petals (all with less should be cut off with a scissors), and save the seed from these only. Give the plants two doses of liquid manure, one just as the seed is forming, and another just before it ripens. Plants thus treated will give seed producing 90 per cent. of double flowers the following year. Of the plants that have given double blooms discard all but the very finest, and these can be propagated by means of cuttings. The best cuttings are pieces of short-jointed stuff, with a "heel" of old wood. Plant in pots filled with a light sandy soil. They strike better if covered with a hand-glass or if placed in a box covered with glass.

— The Hollyhock. —

The Hollyhock, with its tall clustered stems of delicately colored rosettes, is a stranger in many gardens, yet there are few more grand and stately plants than this old English flower. Spring is the time to sow the seed in pans, clean and well drained, using a mixture of loam, leaf-mould, and plenty of sand. Let the soil be made fairly firm, and scatter the seed thinly and evenly over the surface and press it into the soil with the bottom of a clean flower-pot. Then cover up the seed to the depth of a quarter of an inch, after which slightly press the soil again, and then give a watering through a very fine rose water-can. Place sheets of glass over the pots or pans. If the seed is good the young plants will soon be through the soil, when the squares of glass should be removed. When large enough transfer them to a nursery. As the plants attain size and vigour do not allow them to receive a check, but keep them growing. If to be planted in borders in which other plants and shrubs are growing a hole should be made, and fresh soil and decayed manure intermixed, filling up the hole with the mixture mentioned. Hollyhocks delight in sweet, moderately rich soil, and should be given a fairly open position. Liquid manure to the roots will be very helpful just before flowering time.

— Perennial Phlox. —

Though this grand perennial is undoubtedly more at home in the hills, there is no reason why it should not be successfully grown more frequently around Adelaide than is the case. One has, of course to pay some attention to its likes and dislikes, but given a reasonable amount of care it will thrive splendidly. A moderately deep and moderately rich soil, a full supply of moisture and some protection by means of a fence, screen, or shrubbery from hot winds and perpetual sun, are what it asks for, and will well respond to. On the other hand, as an ornament for a central bed, in a sun drenched garden on a shallow limestone soil it will probably be a dead failure, very much dead, in fact. Seedlings are procurable now, or seed may be sown in spring, and the young plants set out in the following autumn. They do excellently either singly, in small groups of one colour, or in masses of mixed colours; in either case the bold growth and big heads of bloom are very attractive. There are many named varieties, of which Etna is a brilliant orange red, with maroon centre; Coquelicot, scarlet, with purple centre, very bright; Caron d'Ashe, carmine, rosy centre; Faust, white, with rosy eye; Boule de Feu, fiery crimson; Gideon, salmon pink, with dark eye; Jeanne d'Arc, pure white; Huxley, large white, lilac eye; Evenement, rosy-gold, light wallflower centre, some of which are probably procurable here.

— Ten-Week Stock. —

This is one of the most popular of annuals, doubtless because of the variety and brilliancy of its colours, its fine perfume, and the easiness of its culture. Those who sowed seed early have plants that will most likely be in flower shortly, and continue so for some months, giving welcome bloom.

Good flowers cannot be expected from cheap seed, and when raising your own seedlings it will amply repay you to get the best. It is most disappointing, after taking a lot of trouble with a bed, to have them turn out mostly single. This, to a great extent, may be avoided by paying a little more for your seed.

Seed may still be sown in boxes and pans. Use a sandy loam that has been put through an eighth-inch mesh sieve. Sow thinly, and cover lightly with sand or sifted stable manure. Prick out an inch apart in boxes filled with a loose loam, when the seedlings are showing four or six leaves.

If the seedlings have been procured at a nurseryman's it pays to place them in boxes or pots first, instead of putting them out into the border at once. Larger plants have a better chance against the enemies of the garden. When transplanting, it will be found a good plan to place them somewhat close together, say, from six to nine inches apart. Then, when the single-flowered ones show themselves, they may be pulled out and the space is scarcely noticeable.

Did you ever try propagating the double varieties by means of cuttings? This, of course, is the surest way of getting plants bearing double blooms, for every cutting taken from a plant will bear a flower similar to the parent. The best "slips" are made of the young stuff that sometimes springs from the main stem. Take these off with a sharp knife with a small "heel" of old wood when about three inches long.

Have some five-inch pots all ready prepared, a layer of drainage at the bottom, and filled to within half an inch of the rim with a fine, sandy loam. Press firmly round the base of each, and give a good watering. Allow them to drain for half an hour then place in a shaded place, plunging the pot in tan. With a little bot-

tom heat they will strike all the more readily.

Although the stock will do in any ordinary garden loam, still it delights most in one of a sandy nature that has been enriched by the turning in of a considerable amount of sheep or cow manure, and where possible this should be secured for it.

Like most other plants, they are benefited by the stirring of the surface of the bed with the hoe. This not only allows the atmosphere free access to the roots, but keeps down the growth of weeds, and destroys possible shelter of slugs, snails, and other pests. The size of the blooms and the brightness of the colours may be materially improved by giving them liquid manure as soon as the buds make their appearance. Guano water especially is good for them, using an ounce to a gallon of water. Ammonia water, also, may be used with advantage, the strength being a teaspoonful to a gallon.

— The Japanese Anemone. —

These well-known plants are beautiful alike in flower and foliage; they are, in fact, one of the most useful of our autumn friends. They belong to the "no trouble" class, for once established they will grow, and bloom, seed, and spread if just left alone in some congenial spot, where there is a fairly good soil, and where they can get a reasonable amount of water. Even if kept a little stinted it is a happy, cheerful flower that always seems to do its best. They seed so freely that quite a crowd of seedlings usually show themselves around the old plants. Another way of increasing the stock is to take up the plants when the foliage has died down, and cut the roots into three-inch lengths. If these are planted about 3 inches deep, they will soon make growth, and become nice-sized plants by next flowering season. The colour of the true Japanese anemone is a very pretty rose tint, the variety Whirlwind has semi-double white blooms, whilst in Honorine Joubert (one of the best of the class) the flowers are of the same colour, but single.

Potting Compost.

One need only grow a plant in soil made by pulling into pieces, about the size of a pigeon's egg, the turf from a pasture and another in ordinary garden soil to see which is more to the plant's liking, writes a contributor to "The Garden." By turfy loam is meant the combination with the loam of grassy matter, such as pasture grass and roots, all of which, being of a fibrous nature, prevents the soil becoming close and hard, and as it decays also becomes plant foot. Loam is a term that may be said to be applied to ordinary garden soil; it is used to distinguish this from leaf soil, peat, etc. There are many sorts of loam, but that known as turfy or fibrous is best for ordinary purposes for the reasons stated. Besides containing more plant food, it is in better mechanical condition and is not so liable to become sour and distasteful to plant roots as ordinary garden soil. Leaf mould consists of decayed tree leaves. The best way to obtain good leaf-soil is to collect the leaves and put them, while damp, in a heap to decay. Occasionally turn and mix them to ensure decay; at least a year is necessary to obtain good leaf-soil. It is a good plan to dust soot over the heaps when turning it; this clears it of insects.

Facts About the Rose.

The antiquity of the Rose is so great that all account of its origin has been lost.

The Rose is mentioned in the earliest Coptic manuscripts. India's traditions take the Rose to the times of the gods on earth.

Etymologically, "rose" is from the Celtic rhodd or rhudd, red; also the root of "ruddy." The Greek word, rhodon, has the same meaning.

Botanists know of over 1,000 species of the wild Rose, and the varieties are innumerable.

Every continent in the world, with the solitary exception of Australia, produces wild Roses.

The Queen of Flowers constitutes only a very small proportion of the Rose family, of which, roughly speaking, no less than about 100 genera and 1,000 species are known, while many species boast of practically innumerable varieties. The Rose tribe (the Rosaceae) includes also some of our most delicious fruits, such, for instance, as apples, pears, quinces, cherries, plums, peaches, nectarines, almonds, apricots, strawberries, raspberries, and the humble fruit of the bramble.

(Continued from page 577).

"indispensable" of mine is the Weeping Mulberry, for I know nothing better for covering or making an arbour or a shady summer walk.

— Roses. —

Probably I shall be considered alost immoral when I suggest that the Rose is being rather overdone in our Adelaide gardens. I grant most willingly, her charming individuality, her wealth of colour, variety of form, and gracious fragrance. The Queen of Flowers is, I know, first and foremost in all these most excellent qualities, but still there are many charming and dainty maids of honour in the court of the Queen. Let us not forget them. It is not, after all, the Rose which is at fault, but rather her too ardent admirers, who in their eager devotion try to cram ten plants where there is but room for one. The Rose is naturally a handsome, stately plant, ample and dignified in proportion, sufficient unto itself. It is not and was never meant to be a tar brush mounted on a walking stick. It is as easy to grow a Rose 6 ft. high and of like diameter, as it is the parodies of plants which the exigencies of space, the rush for new varieties, and the tender attentions of the pruning butcher are making so common in our suburban gardens. Here's a rose shoot, let's cut it off! seems to be too frequently the working motto of the rose grower. By all means cut it off in reason and in season, but don't stop home quite every Saturday afternoon to prune your rose bush. Go to football now and again; you will be surprised how much the rose, at all events, will enjoy and benefit by it.

(To be continued.)

Smilax.

— Medeola Asparagoides. —

The above climber I believe to be one of the most useful and prettiest we have, as all who have table decoration of any kind to do will agree. It is easily grown from seed. To do so, take a pan which is clean, place it in a bucket of boiling water and leave it to dry for a few minutes, to prevent the green growth that generally appears when having to stand any length of time. Place a crock over each hole, and a layer of moss over that, and 1½ inches of rough sail. Then nearly fill up with sifted soil, which should be two-parts loam, one part leaf mould, and one part coarse sand. Press the whole down moderately firm, and dibble the seeds in 1½ inches apart. Then hold the pan in water until the water soaks up through the bottom, afterwards letting the pan drain, covering with a piece of glass. As soon as the seedlings are well up, they should be lifted carefully and potted into 60 size pots, and when established, they can be placed in their permanent quarters, strands of green carpet thread being fixed for them to climb up. When wanted for use, the thread should be cut off at top and bottom with the Smilax, as if green thread is used it will not be seen. After all have been cut, allow the roots to dry off for about two months, but not to get dust dry. As soon as they begin to show signs of growth they should have a top dressing of bone meal. They will take plenty of water in the growing period.—" D " in " The Garden."

Monotony in the Garden.

Ought we not sometimes to ask and answer to the best of our abilities various leading questions as to the beauty, or the lack of it in our gardens '—" Is the garden too much alike in all its parts so that we cannot get away from a feeling of monotony ? " Where we are obliged to reply " Yes it is," this state of things may arise from too great a uniformity in the ground plan, and this may be accentuated by having the same varieties of plants too generally distributed. Perhaps the ground plan can be bettered, and a little artistic skill and knowledge brought to bear, and how sadly often this could be done, but it is not. However, the present is the time to take any such alterations in hand. And I want to say here, do not let us oberlook the extreme decorativeness of at least one raised border in the garden. Let us think of it—in no way does it take from the 'sense of breadth ; it affords a splendidly drained site for plants that cannot stand a water-logged soil during the winter, and thirdly we have the facing of this raised border to utilise, and utilise beautifully, even if it be but of a foot's depth for masses of rock-lovers that cover the stone or clinker facing, and give us a line of vivid and brilliant colour if well planted.

— Breaking the Line of Sight. —

It may be that a dividing screen, such as a line of Rambler Roses along the side or end of a lawn, or other position, will prevent the garden being covered by the eye at a glance. It is a matter of importance to see that this is not possible, and in a small garden, a line of Roses may accomplish this end and be in itself a beautiful feature. I would suggest in a really small garden using but one variety of Rose, or at least one colour, pink or white or crimson, to secure a grand effect ; any of the favourite Rambler section would be suitable. Or, again, if preferred, some graceful climber could be used in this same manner, and if, say, even half a dozen made a line at the far end of a little lawn what a gorgeous feature in the little garden would be secured.

— The Sense of Breadth. —

I am treating of the small garden more especially and I should like to emphasise the fact that even

here we must try to secure a sense of breadth; and by this I mean we must make the little garden appear as large, as ample, as restful as possible. That is another question we may seek to answer at this season. Do our gardens answer to these conditions? Il not, it may be because they are too intricate and we can give them these eminently desirable qualities by simplifying the design as much as possible. I am quite sure it is a mistake to begrudge a path of a reasonable width; to my mind nothing makes a garden look so insignificant and toy-like as a two-foot, or thereabouts, pathway. I feel sure it must be hard lines in a very small garden to widen one of these narrow pathways at the expense of the small lawn or the narrow border, but still I know it is worth it. Suppose we take six inches from the lawn on one side and six inches from the border on the other and give them to the mean little pathway—immediately the whole design seems to grow in simplicity, in breadth of design, and in restfulness.—" A," in " Horticulture."

Some folks are so busy spreading scandal in the township store, that they haven't time to spread manure on their fields.

Beautifying the Walls.

Many a house would be beautified by having its walls rose clad. While there are these walls bare, no one can raise the plea that they have no room to grow beautiful Roses. It is worth while when planting in this particular position to take especial pains to supply suitable soil. The position is often a dry one, and the soil poor. Then, the poor soil should be removed and a couple of barrow loads of good soil should replace it. We have to remember that we are planting a thing that is to last for years, and that in future we shall not expect to do more for it than give an occasional top-dressing. The soil should be worked considerably lower than the roots are to be placed in the first instance, and the hole made must be ample, so that the roots can be carefully spread out. Stable manure, crushed bones, heavy loam, especially if this last is of a greasy, yellow nature, are all good. These climbing roses have to make rampant growth to cover your wall space; it is no wonder that they are in need of ample supplies of nourishment. It is also essential that they never suffer from lack of moisture, especially until they have made a generous supply of roots.

A Slug and Snail Trap.

A correspondent in " The Gardening world," says:—" In the course of an extensive gardening experience the writer has tried almost every slug and snail destroyer that human ingenuity could invent, only to find at last a trap provided by nature which puts all others completely in the shade. This is the common yellow Alyssum, A. saxatile, which this spring has performed marvellous feats of snail catching in his garden. He has only one plant, about two feet across, and before it came into bloom he had no reason whatever to suspect that it possessed any attraction for slugs or snails. Once the golden sheet of bloom was expanded, however, a great change came about. An admiring glance at the plant one morning when its flowers were opening discovered a snail; closer examination brought the total up to fifteen. From then onwards until the last blooms had faded the plant never failed to yield its quota of slugs and snails, both morning and night, snails greatly preponderating. His record catch was 135 one morning, and 56 the same evening; not a bad day's work for one plant.

Climbing Niphetos.

The ordinary Niphetos is relatively a dwarf-growing plant, but the climbing variety is of much more vigorous growth.

The flowers of both the type and climbing variety are pure white, sometimes very faintly tinted with lemon in the centre. The buds are always long and pointed, of beautiful form, and when disbudded to a single bloom on each shoot they attain a large size. When the conditions are favourable the plant blooms freely and continuously.

Small Shrubs for Small Gardens.

Few gardeners have space to grow all the shrubs they would like to, and in small gardens where it is necessary to economise space as much as possible, it is a good plan to select them on the "much beauty in little compass principle." There are scores of very good and very beautiful things in the under 6 ft. class, and a few which are just a little better. Readers will find that the following are of "the just a little better" sort.

— Plumbago. —

Though not the most shapely of shrubs, the blue flowered plumbago is worth a place in any garden. In the hot months when this shrub is at its best its delicate blue tint is very restful amidst the blaze of the summer garden.

— The Hibiscus. —

Of this there are numerous varieties, nearly all of them very good. H. splendens and grandiflora, single scarlets, are both excellent, the only noticeable difference being in the shape of the leaves. The variety Peachblow has a very beautiful double pink flower, which is borne in great abundance. H. Lambertiana is also a double flowered form, in which the colour is a brilliant scarlet. Any position as long as it is sunny and almost any soil will suit the Hibiscus. All these varieties are deciduous and lose their leaves in winter.

— Daphne. —

The Daphne is a favourite with everyone, because of its delightful scent. It thrives best in a deep rich soil, and requires plenty of water in summer, still it must not be trusted as a semi-aquatic. It is quite a small shrub, usually from 2 to 4 feet high, and evergreen.

— Spiraea. —

This dwarf growing deciduous plant may be labelled "dead hardy," one of those plants that will grow even after being pruned by the family cow, which occasionally gets into the garden. The spiraeas may be had in considerable variety, and all beautiful, and all worth growing. They like a position somewhat sheltered from the hot winds of summer.

— Deutzias. —

This is the name of a very pretty, very hardy, deciduous shrub, bearing in the spring time quantities of white bloom. Deutzia gracilis only grows 2 ft, high, and is one of the best; another kind named flora pleno bars double flowers, and is extremely beautiful as a cut flower, being useful in the making up of buttonholes.

— Philadelphus Coronarius. —

Very handsome deciduous shrubs, attaining a height of about 5 ft., and bearing sweetly scented white flowers. .If placed in a position sheltered from boisterous winds the delicate blooms will last much longer on the bushes. They like a nice rich soil, and require to be mulched and watered during hot weather.

— Pyrus Japonica. —

This will do almost anywhere, and in any soil. Its flowers, of a bright scarlet, cover the bush before any foliage apepars. The pyrus grows to a height of about 6 ft., and can be highly recommended to anyone in search of a flowering shrub.

— Prunus Sinensis. —

Alba and rosea (the double flowering plums) may be labelled good. They are dwarf, their extreme height being less than 5 ft., but few things can compare with them for chaste beauty when their branches are laden with their snow-like or pink burdens in the spring time.

—Aloysia Citriodora. —

The lemon-scented verbena is amongst shrubs what the violet and Mignonette is amongst herbaceous plants. But it is not only for its sweetly-scented foliage that it is desirable, its unassuming white flowers are useful as cut flowers, especially when used in conjunction with maiden-hair fern.

— Diplacus Glutinosus. —

This is a neat little shrub blooming throughout the summer months. It only grows 2 ft. high, and the flowers, which resemble in shape a pentstemon, are of an orange red colour. A couple of plants will supply flowers for the decoration of the dinner-table throughout six months in the year.

— Brugmansia. —

A very beautiful deciduous shrub. It bears a long bell-like flower with a drooping habit, and on the bush they look very pretty. The spot where they are to be planted requires to be well manured beforehand with some ancient stable manure, and more should be placed round the plant to protect it.

— Chorozemas. —

Pretty shrubs, the tallest being only 3 ft. high. They are evergreens, bearing orange and red blooms. Thrive in an ordinary garden soil, but require no manure.

Present Work in the Garden.

CARNATIONS.

In common with many other seedlings, Carnations are often kept too long in the seed boxes, with the result that they either get tall and weak or fail to make progress at all. They are best pricked out, when they have made an inch or so of growth, into boxes or beds of light sandy soil, in which the drainage is perfect. If they are set three or perhaps four inches apart, they can be left to make stocky, sturdy plants, and will not require another move till they go to the place in which they are to flower. It is important that this soil should be free, and poor rather than rich. The surface should be stirred frequently if it shows any signs of hardening, and of course weeds should be conspicuous by their absence. Six or eight weeks of this treatment will probably find them in fine condition for moving, with a root system that will go far to ensure success. Do not forget that pinching back is essential.

CINERARIAS.

The Cineraria, one of our most valuable of winter flowering plants, whether for the open border, the shadehouse, or for house decoration, will, like most others, respond to a little careful treatment. Re-potting, for instance, must be attended to. It is sometimes said that these plants flower best when they are decidedly pot-bound. Though there may be, and probably is, some truth in this, it is quite easy to overdo the idea. If just before the buds form the pots are filled with roots, a shift into a slightly larger size pot, though it may delay flowering a little, will, on the other hand, strengthen the plant, and lengthen the period of bloom. A nine-inch pot should be large enough for a very well grown plant, and many beautiful displays are staged in sixes and sevens. When the buds are forming give weak liquid manure twice a week. Many people think liquid manure is "too much trouble." Just try the effect on half-a-dozen plants; you will probably come to the conclusion that if it is a trouble, it is well repaid. More important than liquid manure is the watering. One is apt to think that watering in winter is not important. This, of course, is a mistake, anyway there are very few plants which more quickly show neglect of this than does the Cinararia. To allow pots or a bed to become dry at this time is pretty nearly fatal. This does not mean that they want a perpetual bath, but certainly the plants should never be allowed to show by so much as the softening of a leaf, that they want water. The Cinararia has two principle enemies. Aphis, when they are kept close, and frost in the open. Fumigation or a weak tobacco wash will cure the former, and for the latter a light watering over the foliage before the sun gets to them, is the prescribed remedy.

PRIMROSES AND POLYANTHUS.

If old clumps of Primroses, Polyanthus, and Polyanthus Primroses have not already been divided this should be done without any delay; that is, of course, if the old plants are in suitable condition. The best time to make division is probably when the new growth is an inch or so long. Take up the old roots, wash away all old soil and cut (do not break) the old crown apart. You will find no difficulty in knowing where to cut. Each separated piece should, of course, have some amount of root attached to it. These pieces may either be set in a nursery bed or straight into the positions in which they are to flower, depending somewhat on the forwardness of the plants and whether or no the permanent position is ready. They should be set 5 inches apart in a nursery bed, or twice that distance for flowering. They want to be planted in fair quantity to be most effective. They make a very effective edging planted either in single or double row. To prepare a bed for them dig in some sand (unless, of course, your soil is already of that nature), and a good quantity of old manure. The position for this class of plant should be well drained, they want plenty of moisture, but it must not be stagnant.

Honesty.

"Honesty" and "Satin Flower" are the common names given to the European plant botanically known as "Moonwort." It is occasionally seen in Victorian gardens, writes "The Australasian," but in Germany it is largely grown for supplying the florists of America, London, Paris, and Vienna. It thrives so well with us that it might pay some of our Melbourne growers to cultivate the plant in numbers. The flowers of this plant are of a pleasing violet colour, and throughout Europe are considered as an especially valuable decorative material; but it is the peculiar seed-pods which are so useful and attractive. These seed vessels look like transparent silver, nearly two inches across, and are produced in sprays of from twelve to forty-eight inches in length. A strong plant will produce stems nearly five feet high, with as many as 600 orbs on it at the same time. For mixing with grasses, statices, and other dried flowers for winter decoration, the Lunaria seed-vessels are valuable. In addition to the common purple kind, there is also a white variety, also one with green and white foliage. At Dresden the balloon-like seed pods are sold at from 6d. to 4/- per bunch, according to size and quality. The plant is not particular as to soil, is perfectly hardy about Melbourne, and is propagated by seed, which should be sown in early autumn.

The A.M.P. Society continues to progress in a most convincing manner. The total amount of accumulated funds has now reached £30,000,000, while claims paid is £37,320,000. Policy holders have participated in cash bonuses to the tune of £17,790,000. The Society claims that its bonuses are larger than those of any other Mutual Office operating in the Commonwealth, and to such statement there is no challenge. During the absence of the Resident Secretary (Mr. Chas. A. Schultz) who is enjoying a trip in the Old Country, Mr. W. Percy Hood is acting in that capacity.

The Raising of Orchids from Seeds.

The raising of plants from seed is always an interesting pursuit, especially when the object is to produce a new "break" in either flowers, fruits or vegetables. There is a certain degree of delightful expectancy which only those who have had practical experience can realise, and this is more especially felt when raising Orchids from seed. Although much has been accomplished with this great family, more remains to be done, particularly with some genera; but we must always have an object in view, for the days of haphazard crossing are past, and the old idea "you can never tell what you will get" is obsolete. This, however, is just by the way, and we must assume that the seed-pod is ripe and the contents ready for sowing.

— The House. —

The methods described in the present article apply to most, if not all, epiphital Orchids, of which Cattleya, Laelia, Brassavola and Dendrobium and Calanthe, are best sown around plants belonging to the same genera, selecting a specimen that will not require repotting for at least a year. A warm, moist atmosphere is essential for the successful raising of Orchids from seed, and in some establishments a small frame is arranged in the warmest corner of a house where the temperature varies from 65 degree to 70 degree Fahr. If the body of the frame is extended to the floor it can be kept 5 degree or more higher than the house, while, if necessary, the surroundings can be maintained near saturation point; but this ought not to be overdone, or the canvas and soil will rot before germination takes place.

— Sowing the Seed. —

This is best sown immediately after it is ripe, excepting, perhaps, during the winter months, when it can be stored in paper where the temperature is about 60 degree Fahr. till spring arrives. The pans should be well watered twenty-four hours in advance, the seed may then be sprinkled lightly and evenly over the surface but not covered in any way. Much the best method of distributing the seed is with the blade of an ordinary budding-knife; but after sowing one pod the knife must be carefully wiped before starting another, or the seed may get slightly mixed and cause confusion when the seedlings flower. I might state here that accurate records ought always to be kept. Careful watering is absolutely necessary, and this can be brought about by standing the pans in tepid water and allowing it to percolate through the soil, or employing one of the numerous fine sprayers. After the seed is sown it should never be allowed to become dry, but the other extreme must also be avoided.

— Pricking off the Seedlings. —

In four or five weeks germination will have taken place, providing the seed was fertile, and numerous little green globules will be seen on the surface. As they become larger they are pricked off with a pointed stick into what are known as store pots. These are $2\frac{1}{2}$-inch pots, which are filled three parts of their depth with drainage, the remaining space being occupied with the usual Orchid compost cut up rather fine, and closely clipped so as to form a level and firm surface. From the time of sowing the seed till the flowering stage is reached the plants are never permitted to become dry at the base, nor is the rooting medium allowed to get into a sour condition. A moist, buoyant atmosphere is advisable and an average temperature of 65 degree Fahr., while cleanliness is a most important factor, for thrip will soon destroy the tiny seedlings or cripple them to such an extent that progress is considerably retarded. Although the method of raising Orchids from seed is rather different to that adopted for most other plants, yet it really presents very few difficulties. Our aim should be to flower each plant in the shortest possible time, and to this end repot directly a larger receptacle is needed or the soil is in a bad state, keep the house and seedlings quite clean, the surroundings moist, give a gentle spray overhead occasionally during the spring and summer months, using an Abol or similar spraying syringe, and maintain an equable temperature throughout the year. If these details are observed, success is assured. S. T. —"The Garden."

Readers! **Can you write us something about your methods of breeding, rearing and managing Live Stock? Let us have it if it will only fill the back of a Post card.**

Preventing Damping Off.

Those who raise young plants, especially under glass, will appreciate some suggestions for the control of "bed rot" or "damping off" as found in the Market Grower's Journal, which writes:—

"The greatest loss in plant raising is due to the 'damping off' fungus. This disease usually attacks the young plant in the seedling box, causing the stem to turn black and rot off. It is due to too much heat, lack of ventilation, heavy watering, cloudy weather or the use of old soil. This trouble can be almost eliminated by careful attention to watering and ventilation. Loosening the soil slightly between the rows of seedlings is also very beneficial. Some growers avoid this trouble by using sterilized soil. The soil can be sterilized either with steam or with a solution of formalin, two pounds to 50 gallons of water. It will take about two gallons of the solution to sterilize a cubic foot of soil."

The Rose.

The rose has even been a favorite flower of mankind, perhaps the greatest favorite of them all. Poets of every land and of every age have sung its praises, and rightly so, for truly a plant that yields such delightful fragrance, that comes arrayed in such diversity and such splendor of color, is worthy of the homage of all. Something tells me, however, you would rather hear from me something more to the point, what soil and manures are best suited to its needs, and how best to combat its insect and fungoid enemies.

— Location of a Rose Garden. —

First, an open spot where no large overhanging trees can cut off the life-giving sunshine or absorb the necessary light or where the roots (and it is well to remember that the roots of some trees travel a long way in search of food) of trees are likely to enter the rose beds and rob the roses of their own rightful food, says a writer in a recent issue of "Horticulture." If you are fortunate enough to have the choice of soils, choose a medium heavy loam, rather than a light, sandy, or black, peaty soil, and if it is of a yellow or reddish tinge, and has been growing grass for a number of years, so much the better. However, let no one despair because their soil is not just what we could wish, but take heart from the thought that good roses can be grown with a little intelligent care in most any soil that is not absolutely acid or alkaline.

The rose, in common with most all vegetation, thrives and luxuriates the better for being kissed by the morning sun. And if the chill winds are cut off by some friendly building or belt of trees, so much the better. The rose loves a cool, moist medium, for its roots, but it cannot endure wet feet. To make sure that our roses will not suffer from a water-logged subsoil, test pits should be dug at several different points of the proposed location; these test pits should be at least four and a half feet deep and if in average weather water stands more than a few inches deep in these pits, the ground should be tile drained.

Should you find it necessary to drain be sure to do a good job. Put the tile down at least four feet and cover the top two-thirds of the joints with tarred paper, and do not be led into any false notions of accelerated drainage by putting gravel or other porous material on top of the tile; it is a mistake and leads untimately to trouble; refill the ditch with the soil excavated from it and tramp it thoroughly. I shall not attempt to advise you about the design of the rose garden as that is work for the garden architect after studying all the local conditions.

Whoever designs the rose garden should keep in mind certain practical features, such as easy means of access for the periodical mulchings, and that narrow beds are to be preferred because they are easier worked without tramping the soil in wet weather, when tramping would make the surface hard and sticky, which, when dry, would bake and exclude the air.

— Preparation of the Soil. —

Dig deep, should be the motto of every grower of outdoor roses. Nothing less than two feet of well manured, thoroughly broken up soil should satisfy the earnest rosarian, and in most cases to get it will be necessary to remove entirely about one foot of the subsoil and cart in good loam from elsewhere to take the place of that removed. That this sounds like a big undertaking I am well aware, but for those who can afford it it is well worth while, for human nature being what it is, there is one pleasure in enjoying the exquisite color and delightful fragrance of the rose and there is another pleasure—more earthly perhaps but none the less potent—in having better, bigger, finer roses than our neighbor. The competitive spirit is strong in mankind whether it be in the display of wealth or the display of roses. What manures shall we use in preparing the soil? If it is to be had use cow manure, and use it in large, and impressive quantities. If one-sixth to one-eighth of the bulk of prepared soil is cow manure it will hardly be too much; do not put it at the bottom or in layers, but thoroughly incorporate it with the whole mass of the soil. A generous sprinkling of bone meal throughout the mixture will be beneficial as it will supply the phosphoric acid which is deficient in all animal manure. Naturally, if cow manure is unobtainable, horse, sheep or pig manure will make a good substitute, though there is something about cow manure that is very palatable to the rose.

The Lord tempers the wind to the shorn lambs, but the lambs that are shorn in business are compelled to look out for themselves.

The Naturalization of Flowers.

How charming, how exquisitely beautiful are those parts of the garden, which, untrammeled and free, are given up to the naturalization of flowers, and especially to the beautiful flowers of spring, writes "Horticulture."

I should like to remind readers of the great possibilities of this class of work and also to show the wide scope there is for intelligent effort, and original ideas. I might also add that the principal lesson to be learned is, how many natural ideas may be employed in the garden, other than beds, borders and walks, which, a great many think, constitute the bounds of the modern garden.

To select the best varieties or class of flower to employ, to secure the most artistic and most natural effects, is by no means an easy task, as so much depends on the tastes to be gratified, natural surroundings and many other things.

Seed Sowing.

Do I recommend sowing where the flowers are to bloom, asks a correspondent to a gardening paper, and he replies: For the most part, no, because such sowing means generally closely crowded plants. If the seedlings be so vigorously weeded out that they stand as far apart as they would if transplanted, that is another matter; but they rarely are. Many people cannot bring themselves to root up and throw away eighty out of a hundred seedlings, so that unless they are prepared to do this, or sow exceedingly thin, then I say again, better by far transplant the seedlings to these beds unless they be varieties that will not bear transplantation.

A copy of Mr. Henry Sewell's pocket rose catalogue is to hand. In addition to a very extensive list of popular roses Mr. Sewell's selection of novelties will be welcomed by all rose lovers. We need do no more than mention that the thirty varieties offered include such roses as Sunburst, British Queen, Yellow Frau Karl Druschki, Nerissa, Helvetia, George Dickson, Duchess of Sutherland, and others which have gained the warmest approval of English critics and growers.

When Autumn is Here.

The poet who sang, "Oh, to be in England, now that April's here," had never experienced an Australian April, when the glory of the autumn is over the land, writes an Australian native. At no other season of the year is Nature so lavish with the colours with which she decks the morning and evening skies.

The crimson and gold of the sky has surely been transferred to the virginia creeper on the eastern wall. It looks so gorgeous in its autumn dress that we waste no time in regrets for its summer mantle of green. The salvia is making brave efforts to hide the ravages of time, and still displays many proud scarlet heads, but the brown lurks behind the leaves, refusing to be hidden, and soon we shall be gathering the seed. Honey-eaters throng in the mina lobata, and myriads of bees, intoxicated with sweetness, crawl lazily over clumps of heliotrope.

The leaves on the orchard trees are thinning, and, loosened from the parent stem, their period of usefulness over, every breeze sends thousands to join the thousands which carpet the earth beneath each tree.

Out in the paddock the great blue gums make cool shadows, where the cows stand knee-deep in grass, whisking lazy tails to drive off some too persistent mosquito. Down in the hollow the carts are busy, and already the plough is at work, and the shouts of the ploughman, as he encourages or reproves his beasts, come faintly to our ears.

On such a day we will do no manner of work unless it be work to make a nest or two for the pullets, which are really going to lay at last, or to carry some bran to the calf, conversing in bovine language with its mother through the fence, or to make lime rings round our new carnations to keep away the snails.

So the time wears on to evening, the cows leave the pasture, and call out that it is milking time. The sparrows and starlings have their nightly squabble over the one desirable roosting place in the fig tree, and the opal lights of sunset have scarcely faded from the sky when the moon sails up to make a perfect ending for that "gift of God—a perfect day."

Primula Kewenseis.

This beautiful hybrid primula, which was sent out from England a few years ago with such high recommendations, has well justified the good opinions which were given it by the raisers. Owing to its parentage it was confidently expected to prove an acquisition of more than ordinary merit, and so far as our experience goes, writes an expert grower, we have found it to be the most useful primula in cultivation at the present time.

The two parents of Primula Kewensis, Primulas floribunda and verticillata, are both well known varieties, which have been extensively grown for many years. The hybrid variety has, however, far surpassed its parents, being more floriferous, much more valuable for decorative purposes and when well grown makes a plant which for real beauty cannot be equalled by any other primula in cultivation.

There are quite a few people who have failed to get good results with this primula. The most common complaint is that their plants after having thrown up two or three flower spikes, become exhausted, and cease to produce more. Other growers have tried the plan of "growing on" a few of their last year's plants; but the experiment met with very indifferent results.

Personally we have found no difficulty in growing this primula. Our plan is to sow the seed early, and, as soon as the seedlings are large enough, we prick them off into flats. When the plants are ready for a shift we pot them into $2\frac{1}{2}$ inch pots and give successive shifts as required. Like all other primulas they should be grown in frames outside during the summer months and kept well shaded.

This primula, from a decocative point of view, is as near perfect as one could wish. I have seen plants with from a dozen to eighteen spikes in flower at one time, each averaging about eighteen inches in length, foliage being perfect, making a pot plant of unusual beauty and elegance. The color of the flowers is of a delightful primrose shade, the foliage is always healthy and green, and with a little care in the watering and picking off dead flowers it will last easily two or three weeks in the dwelling house. —"Horticulture."

Trenching.

Many people with ground standing idle like to begin digging early in the autumn. I have had a good fill of trenching at one time and another, therefore I know the labour it entails. The more fortunate would, perhaps, be disposed to hire a man to deal with fresh ground, but it is not always easy to secure a man who will do the work thoroughly. At the present time I am busily engaged in trenching a piece of new ground, or I should say bastard trenching. Trenching proper means delving three spits deep, but when the soil is only two spits deep on top of limestone or gravel, where are we with our trenching? The thing is to do the job as thoroughly as

circumstances will permit. The system of trenching I firmly believe in is to keep each strata of soil in its proper place, unless the ground has been trenched before. Some people will argue that the subsoil and the, shall I say, sub-subsoil will become as good as the top soil if it is brought to the surface and manured. It will, but not in one or two seasons. The general run of land has been cultivated at some time or other, and if it has, then depend upon it only the top few inches is of any great account. Even if the land has never been cultivated, the top soil is far superior to that underneath as regards fertility. If the top is poor, then the bottom will be poorer, the reason being that the top soil has been worked by man at some time or other. Furthermore, leaves and other decaying matter settle on the surface and so enrich it. Therefore do not put the top at the bottom and the bottom on top. It is a scheme that won't work. Those who swear by turning all land topsy turvy at the first operation do not rely on the dead earth for growing things. Not they! One will find that they have a pile of manure, etc., as big as a small mountain. This is piled on by the cartload and well mixed with the original soi,. Consequently the plants set soil do not worry about the dead soil, but send their roots out hunting for the other stuff. Small wonder either. Of course soils vary. I know of places where one can dig five feet deep, and still find good loamy soil that will quickly become fertile. Then again, I have found places where a nasty greasy "clay" lies two feet or less under the surface. This stuff will take years to get into condition. I have known men to bring up such stuff after reading about trenching, and I have heard them talk afterwards, well, differently.

Weeds are always troublesome, especially on lawns. When cut with a knife they soon grow again. The poison spear is useful in careful hands, but if the liquid is too strong it spreads, killing the grass in large patches. Many weeds will be found to have grown again, showing the poison does not go far enough. The device suggested by an old gardener, is an old fork with the outside tines cut off, leaving the tread full length. This tool, he says, will be found most useful with which to lift strong growing weeds, as by having only two tines the smallest amount of earth is lifted.

Fruit Garden

Apples for Export.

Major Norton, Trade Commissioner in London, in a recent report on the apple trade and its possibilities, remarks that the shipping to England or the Continent of immature or unsuitable apples is a great disadvantage to growers in Australia. He criticises last year's shipments from this State by saying that at least 25 per cent. ought never to have been sent. Too much was so immature that it become shrivelled on reaching the English market, and the sales returns in many instances did not cover out-of-pocket expenses. Such indifferent lots also affect the selling average, and the prices for good apples suffer. The Trade Commissioner strongly urges that several varieties—notably Gravenstein, Ben Davis, Hoover, Nickajack, Shepherd's Perfection, and similar kinds—should never be shipped at all. Many of these are bad carriers, and none of them is liked in the English market; he therefore recommends their being dried, but on no account should they be sent oversea. The varieties approved, and which under normal conditions will always yield good returns, he suggests are Cleopatras, Jonathans, Orange Pippins, Dunn's Seedling, Rome Beauties, Wellingtons, Stone Pippins, and Spitzenberg. His advice to those desirous of doing an export business is not to grow any other sorts, unless akin to the kinds named. New lines should be avoided, as the regular buyers do not care to venture beyond what they are previously accustomed to, and in consequence new varieties suffer in prices realised. Less variety but more reliability is emphasised.

A simple method of destroying the common fern or bracken is referred to in the "Estate Magazine." The plan is to run chain harrows over the ground when the delicate fronds are first making their appearance in the spring. At that stage they are very brittle and easily broken off, and if this is done repeatedly as they appear, it cannot fail to weaken the plants greatly. The essential point is to persist in the treatment, which should result in the complete eradication of the bracken if done for two or three successive springs. On many occasions the rolling-down of bracken has been recommended, bu the chain-harrowing may be better in ground that is not very even.

Root Pruning.

In rich soils, Apples, Pears, Plums, Cherries and other trees are liable to grow into a mass of leaves and young wood after having been planted three or four years. Naturally some fruit trees are of vigorous growth, and when they find themselves in rich soil they proceed to establish themselves on a large basis—that is, they make growth suitable for the foundation of what would ultimately become a large tree. This is contrary to the desire of the fruit grower, but especially those having only small gardens or a small amount of space to devote to fruit. Root pruning is one of the methods by which this difficulty can be overcome. In nurseries trees are frequently lifted in order to give them more room or to plant those closer together which occupy the ground in a scattered way after the rest of the stock has been sold. This transplanting of young trees practically serves the same purpose as the root-pruning of an older tree.

Root-pruning may be done during autumn or winter, the earlier the better after it can be done with safety to the tree. If the tree has been some years in its position, and the grower has some doubt as to the safety of doing the root-pruning entirely at one time, he would extend it over two years. A tree that had only been planted three or four years would not hurt if the root-pruning was completed at one and the same time, but with a tree twenty or thirty years old the case would be different.

The plan is to take out a trench at a certain distance from the trunk according to the size and age of the same. All the strong roots that pass through this are cut. Done with a spade this will leave a more or less ragged end to the roots that have been cut. They should be trimmed, however, with a sharp knife, so as to leave no ragged ends for holding moisture or causing decay.

Fill up the trench with fresh soil after the root-pruning has been completed. If the natural soil is poor this gives an opportunity of introducing some better soil in order to encourage the production of numerous fibrous roots at the cut ends of the strong roots.

Winter Cultivation.

Those who have taken our advice, says a writer in a Sydney paper, will now have the soil of their citrus orchard at rest, and owing to its well manured, friable condition, growing a thick crop of winter weeds. If the winter is dry, these weeds will not come to much ; if wet, they will provide nature's green manure to turn in with the cultivator in the spring. In the meantime the untilled soil keeps the frost from nipping the feeding-roots of the trees, and the moisture taken by the weeds is not a hard drain on the trees, as it would be in summer time. Winter fallowing of the orchard joined to incessant summer cultivation, is the profitable plan. The system has another advantage. The winter is the time when the main crop of citrus and passion fruit is harvested and all hands are wanted for that work alone. It was very probably true

in the first place owing to some accident and the shortness of labour that an orchardist of old time neglected his almost sacred winter ploughing, and then was surprised to find his orchard the following year all the better for it. A few such experiences would naturally lead the densest persan to conclude that there must be something wrong in the old theory as applied to his conditions, and thenceforth he forsook the plough, or kept it as an heirloom of his grandfather.

Punch's advice to those about to marry applies then to the winter cultivation of the orchard—

Don't !

Orange Trees Not Thriving.

Reply to "King."—There is nothing in the variety to account for the three trees you mention not thriving. It is perfectly hardy though not a robust grower. You do not mention what kind of soil they are growing or trying to grow in or how long they have been planted. If only recently planted, the condition you mention is not unnatural, it simply means that the roots have not taken hold of their new quarters. If they are older trees it may be that they have been neglected in the matter of watering. Possibly, if they are old trees and the soil is not naturally rich or they have not been fed with manure, they have come to the end of the food supply. Again, they may have been badly planted on ground which had received no preparation. It is also possible that you have been too liberal with the watering, which is not uncommon in a badly drained situation. What is best to do will largely depend on circumstances. If you will give us more particulars we shall probably be able to help you. In the meantime have a look at the roots by carefully removing some of the soil. If these are bunched up in a ball (assuming the trees, to, have been recently planted) but are showing signs of life, you can either leave the trees alone or it may be worth while replacing. In older trees, if the roots are in a bad state there is not much hope of recovery, but it might be worth trying the effect of cutting some of them back and filling in any holes or trench you may dig, with fresh soil, in which there is some sand and a good deal of well decayed vegetable matter. Note the condition of the bark at the ground line.

Fruits to Batavia.

The results of four shipments of apples from the Bathurst Experiment Farm are reported in the May issue of the Agricultural Gazette of New South Wales. In the first shipment, which consisted of 200 cases of Cleopatras, Munroe's Favourite, Jonathan, Granny Smith, Stone Pippin, and Five Crown, prices ranged from 11/8 to 20/10 per case. Gross proceeds were £177 5/10; expenses £87 11/6, plus 1/6½, Bathurst to Sydney, leaving net to grower at Bathurst, 7/4. The second shipment (Granny Smith, Rome Beauty and Stone Pippin) realized from 14/2 to 20/2 per case. The net price to Sydney is given as 9/6½. The charges, Bathurst to Sydney, as before, amounted to 1/6½ per acre, which gives 8/- per case net return to packing house, Experimental Farm, Bathurst. The third shipment (same varieties, with Munroe's Favourite) on the same basis, work out at 6/6 at the orchard. Gross receipts being from 15/- to 20/10 per case. In the fourth shipment, which included Stone Pippin and Granny Smith only, net returns to Bathurst were 5/6½. The report concludes, "While it is obvious from the foregoing statements that the charges incurred in exporting apples to Java are very high, the net prices realized offer a handsome margin of profit for the grower. Doubtless the costs will be materially reduced when the fruit export trade to Java is properly organized, and regular shipments assured, and there can be no danger of overproduction with such a profitable outlet close to our shores.

Over-Crowding.

The saying that "variety is the spice of life" is accepted as a true one, but when carried to excess as is done in many gardens, variety becomes one of the most troublesome of burdens.

How often we see plants all packed indiscriminately together in with sometimes the larger plants elevated, with the smaller ones all crowded underneath. Thus arranged they may look attractive from a distance, but they will not stand critical examination and cannot be regarded as evidencing either good culture or good taste. Light and air play so important a part in the life of a plant that all unnecessary stock should be dumped. If under glass or shade where overcrowding most prevails, troubles are many. Insects of every description thrive and unsightly pots with the soil half-washed out are often found. On the other hand, when plants are so arranged that each has ample room, health and vigor prevail, better facilities are afforded for accurate judgment in regard to watering and, "last but not least," there is greater opportunity for the display of the beauty of the plant individually.

The Pomological Congress.

Too much importance, writes "Penang" in The Australasian, cannot be attached to the work performed by delegates to the Pomological Congress, which met in Melbourne to prepare their preliminary report for presentation at the next meeting of the Australasian Fruitgrowers' Association. This will be held in Adelaide towards the end of the year. To classify all the varieties of apples and pears, which often are known by different names in the States in which they are grown, was impossible in the time which members of the congress had at their disposal. They, nevertheless, covered a great deal of the ground, as will be shown in the report to be made public. The various representatives from the different States were generally in unanimity concerning the nomenclature of the fruit, and their combined experience and historical knowledge made it possible to clear up many particulars regarding the origin of several well-known varieties. The congress was mainly constituted of men thoroughly conversant with the fruit industry, among whom were Messrs. F. W. Vear and James Lang, sen., both Victorian growers; Messrs. J. Neil, F. Chilton, and W. J. Allen, New South Wales; Messrs. L. M. Shoobridge, Dr. Benjafield, and Mr. John Osborne, Tasmania; Messrs. H. Wicks and G. R. Laffer, South Australia. Mr. Prescott, who acted as secretary, is also a keen student of ampleography. With so capable a representation of fruit-growing interests to prepare the report, the forthcoming conference cannot fail to endorse the bulk of it when presented for their consideration.

— Some Interesting Decisions. —

Many synonymous terms and local appelations have been given to the various kinds of apples and pears in general cultivation. The origin of these, although often obscure, was thoroughly investigated by the congress, and the recommendations to be submitted are based on statements substantiated by the delegates. Priority of the origin greatly actuated the conclusions arrived at, and, as a result, the Munroe's Favourite and other fruits will shortly be known by other names. In Victoria the name Munroe's Favourite is generally accepted as the true designation of this variety. This name was derived from the fact that a man named Munroe first grew the apple, and offered it for sale on the Castlemaine market. This claim was passed over owing to the South Australian delegates being able to show that it was first produced by Mr. Dunn. The apple, if the recommendations are adopted, will be known in future as Dunn's Favourite. In New Zealand it is known as Ohinemura, while in this State, Dunn's Seedling, Garibaldi, Gander's Seedling, and others are employed to designate the same apple. Another excellent export apple, which is more frequently known as the Wellington Pippin, is in future to come under the name of Dumelow Seedling, which hitherto has been applied synonymously. Among other of the better known varieties which are grown largely for export are Statesman and Cleopatra. Statesman is an apple commonly known as Chandler, it having been raised by a grower of this name at Bayswater. Mr. Chandler, however, gave the seedling the name of Statesman, and for this reason it is desirable that no change be made. The history of the New York Pippin was traced back carefully, and, after weighing all considerations, it was deicded to accept the name Cleopatra in lieu of the widely-accepted substitute. Adams Permain was also among the varieties which was discussed, and despite some slight lack of unanimity, it was decided that the Victorian-grown fruit corresponds with the true Adams Permain. The report to be published later will show the result of many interesting discussions.

— Pears Change Names. —

The objects of the congress were to designate the chief fruits grown by names which, it is hoped, will be rigidly adhered to by all engaged in the fruit industry. By this means not only will confusion be avoided in the terms now adopted on the local and English markets, but nurserymen will be enabled to supply a definite variety. One of the most widely-known pears is that which we in Victoria term the William's Bon Cretien. Adelaide growers and agents know this variety by the name Duchess; while in America and in many other parts, as well as in this State, it frequently goes by the name of Bartlett. This latter cognomen is due to the fact that it was introduced into America by someone of the name of Bartlett. In a canned form this variety is introduced into Australia as the Bartlett Pear. For the sake of convenience, and to avoid misapprehension, the congress wisely decided to abbreviate the name to "Williams." As the Williams pear there can be no misunderstanding on the part of those growers who have previously used its full name. This change will enable greater facility in adoption in other States. There is great need for the acceptance of a specific and rigid classification of varieties. It has been the not infrequent custom of some nurserymen when the Vicar of Winkfield has been ordered to supply the Napoleon, which in some localities differs from the Winkfield, and because of this same indecision to supply Broom Park in place of Eyewood. In the past these errors have been justifiable to an extent, for nurserymen have had grounds for assuming that different varieties were intended because of the widespread local contradictions. When definitely accepted, the new names will afford no extenuating circumstances. In future, the so-called Napoleon will be known by the more common appellation of Vicar of Winkfield. These alterations, together with many others, should receive the approval of growers, and it is likely that after the report has been discussed by the Australasian Association, the delegates will be asked to give effect to the changes by recommending them to the vari-

ous district associations affiliated with central bodies in all the States, so that they may become general throughout the Commonwealth. During the day and a half occupied by the congress in its comparisons and deliberations, a great deal of splendid work was achieved. There is still sufficient matter to engage attention for further meetings, and an effort should be made to bring the delegates together next season, when further specimens of fruits will be again available.

Planting Fruit Trees.

Fruit growers in England and other countries have long held the belief, which, however, does not appear to be based on any experimental investigation of the matter, that fruit trees must be planted in a somewhat elaborate manner, and according to certain fixed principles if success is wanted. The soil is thoroughly prepared ; a wide, but not deep hole is made in which the roots are spread out in all directions, and arranged near the surface, with a slight upward bearing at the ends. It has always been customary, too, to observe many precautions in filling in the soil. Small quantities of finer earth are first worked in amoog the roots, hollow places caused by archings in the stouter roots are filled up, and then the rest of the soil is put in, trodden carefully down, and the whole left to the compacting influence of rain.

The investigations made at the Woburn Fruit Farm, and in one or two other districts, by the same experimenters, some years ago, point to the conclusion, however, that all the elaborate precautions mentioned above, are not only useless, but actually detrimental to the best development of the young tree, and especially of its root system. The experiments, which seem convincing enough, indicate that the proper way to plant a tree is to double the roots up anyhow, and stick the tree in, throw in the soil, and ram it down as if one were fixing a gate post.

According to the figures given in relation to the experiments, the results in the case of 59 per cent. of the trees were in favor of ramming down the soil, 27 per cent. showed no difference (i.e., all the elaborate detail of the ordinary way of planting was simply a waste of time) and in only 14 per cent. of the cases were the results unfavourable to ramming.

Examination of the trees shows that ramming has led to a copious development of fibrous roots. Direct experiments showed that the fibrous and small roots produced in the nursery before lifting play no great part as roots during the subsequent life of the tree ; the important point is to induce fresh root formation, and the ramming does this more rapidly than the orthodox method of planting. No harm was done, and sometimes even good resulted, when the old roots were deliberately damaged before planting.—Agricultural News.

Ringing Orange Trees.

In the Agricultural Gazette of New South Wales, Mr. O. Brooks, Fruit Inspector in the Gosford district, has an interesting note in regard to ringing orange trees with the object of making them set their fruit. Mr. Brooks says, " A number of the trees treated had never carried a crop of fruit previously, but this season, having been ringed, are bearing good crops, and trees which were not treated have very little fruit on. He also states that the most successful way of treating the trees is by making a spiral incision, and taking a bit of bark, about one-eighth of an inch, right out. The operation should be done when the trees are just coming into full bloom. He has seen trees twelve years old, which have never borne fruit, treated in this way, with very satisfactory results.

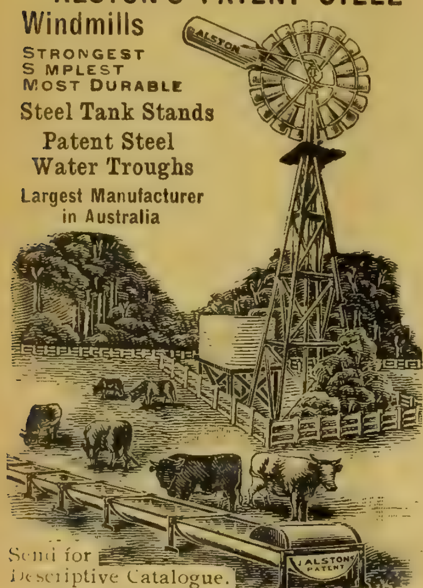
Poultry in the Orchard.

This was the subject of an address given by Mr. Bradshaw, Poultry Expert, to the members of the Kareela branch of the Agricultural Bureau of New South Wales.

The audience were told of the importance of the industry, which was shown by the increasing prices for poultry products for the past half-dozen years, that of eggs amounting to over 45 per cent., a feature which does not apply to any other product of the land, whether stock or crop. The great expansion made in the industry within the past six years was attributed to the excellent Sydney markets for poultry products, carcases, and eggs. These good markets were brought about by the great demand, and the prosperity of our fast increasing urban and suburban population. The audience were told that there was no possibility of the markets in the future being glutted through excessive production. The determination of the community to live well, and their ability to do so, was an assurance of the continuance of the splendid prices for dressed poultry and eggs, and those who kept fowls need have no fear of any decline in the demand.

There were very many families in the State making a good living and to spare solely by their fowls, though they had rent to pay and every ounce of food to buy. This being so, in how much better position should orchardists be who kept fowls as a side issue, with no direct charge against them for rent, and where from one-third to one-half of the food bill can be saved by feeding the various unmarketable produce. The unlimited supply of green stuff on such places, the advantages of manure for the trees, the eradication of insect pests, &c., place the orchardist above all others as the man who should be able to make the most money out of poultry farming.

The industry has proved so profitable during the last few years, especially to orchardists, that some of them are now stocking flocks of 1,000 birds.



Jerusalem Artichoke.

This Artichoke will grow in any soil, but is most sucessful in a deep, well-manured friable loam and open situation. It is profitable for the reason that though it needs considerable space the crop is in proportion. Many object to this root, when served in the same way as Potatoes, but few roots are better for soups and stews. It should be remembered that once the plant is grown, it will reappear from the smallest portion of root, and doubtless that is one reason why the plants are not given new quarters as often as they deserve. It is an easy matter, however, to clear the soil if care is taken when digging. Always purchase or save good sets, trusting nothing that will not give shapely roots. There must be a space of 3 feet between the rows and 12 inches between the sets. More room may be given if available.

A Cure for Slugs.

A correspondent writes :—It may interest other readers to know that I have found powdered alum (2d. per pound) an absolute remedy for slugs, which were a great nuisance before I began using it. It is much less trouble to use than soot or lime and does not harm to plants.

"Do Nots" for Gardeners.

Do not expect the best results from land that is not properly drained, properly manured, and properly dug.

Do not apply rank manure to soil in which tap.rooted vegetables such as Beet roots or Parsnips are to be grown.

Do not forget to red-lead seeds of Peas, and of all the Brassica tribe, before sowing, if mice and birds are plentiful and hungry.

Do not sow seeds too deeply, as many crops fail on this account.

Do not delay too long in thinning crops, or the plants will be weakened.

Do not fail, if possible, to plant out Cabbages, etc., in dull, showery weather.

Do not forget to keep the Dutch hoe at work among crops ; it will kill the weeds, aerate the soil, and exclude the evil effects of a time of drought.

Do not forget that crops of Peas, Beans, Onions, Carrots, and many others are greatly benefited by light dressings of soot, fowl manure, or nitrate of soda during showery weather.

Do not apply stimulants to crops of Strawberries or Tomatos till a good set of fruit has been obtained, or much foliage and little fruit may result.

Do not work soil when very wet, especially heavy soil, or it will become more or less sodden.

Do not dig the mixed beds or borders till all bulbs are showing above ground, unless these have been carefully marked by pegs or stakes.

Do not plant out stuff that has been grown under glass till it has been gradually "hardened off."

Do not delay staking plants till they sustained damage from high winds.

Do not forget that clumps or masses of plants are more effective than stiff, straight lines.

Do not omit to well thin out hardy annuals, or weaklings will be the result.

Do not fail to regularly pick the flower of your Sweet Peas, or a short flowering season will be the result.

Do not water a plant till it is partially dry, then water thoroughly.

Do not repot a plant till it has filled the ball with roots, and then do not overpot.

Planting Strawberries.

The planting of new strawberry beds may be done any time after the young plants are well rooted, and depends somewhat on the season, whether it is [illegible]te or early, [illegible] amount of moisture, natural or artificial which the beds have received. The rooting of the runners is hastened by lightly mulching the old plants with rotten manure, leaves, or rich soil of any kind, and also by frequent waterings. The best runners are those nearest the parent plant, and they should be taken from bearing plants only, as sometimes the plants are barren, and all the cultivation possible will not make them fertile. In lifting the runner to be planted, care should be taken not to break any of the tender roots, and not allow them to get dry in the proces of removal. When planting them the roots must not be bundled together; but spread out like the ribs of an open umbrella, and the plants should be well firmed in the soil. Strong-growing varieties should be planted in rows, two feet apart, and one and a half feet between the plants; but many of the smaller-growing sorts may be planted much closer. The strawberry is the most fickle of fruits, a variety which thrives in one garden may not do so in another, a few rods away. Fresh, virgin soils are esteemed the best; a deep, rich loam answers well, but good crops of strawberries may be found on sandy ground, and even sometimes in that of a gravelly nature. Wood, ashes,burnt vegetable matter of any kind, and potash in any form is good for this fruit. The ground should be deeply worked, say to a depth of 20 or 24 inches, and if the soil be poor, fertilisers should be added. In making a selection of kinds it is better to plant a variety, and prove for oneself which is the best. Melba is proving one of the finest, and should always be tried; but Edith, Joseph Paxton, and Trollope's Victoria, the Captain, and Marguerite are old and popular; and a few of the newer kinds should also be tested.

— Matted Rows —

This system, writes the Agricultural Gazette of N.S.W., is generally adopted by large growers, as it requires less labour to attend to on a large area. By the matted row system more berries are produced on an acre than by the hill culture, but the latter method gives larger and finer berries. The rows are set from 3 to 4 feet apart, and the plants about 15 inches apart in a row. When the runners start they may be so arranged that they form a continuous matted row. The grower can suit himself as to how wide he allows the row to run. Some allow the rows to become 2 feet wide, and others only 1, according to the distance apart the rows have been set. The runners can be kept in check after the row has attained the desired width by using a roller cutter, running up and down between the rows, or by the use of the spade or hoe.

Before planting the new plant, all dead leaves and runners should be removed, and the roots shortened by at least one-third of their length.

The following are the number of plants to the acre, at the distances mentioned:—2 ft. x 1 ft., 21,780; 2 ft. x 1 ft. 6 in., 14,520; 2 ft. x 2 ft., 10,890; 2 ft. x 1 ft. 6 in., 14,520; 3 ft. x 1 ft., 14,520; 3 f.t x 1 ft. 6 in., 9,680; 4 ft. x 1 ft. 10,890; 4 ft. x 1 ft. 6 in., 7,260.

The following list comprises those varieties which at the present time are mostly grown for the best paying results:—Aurie, Annetta, Royal Sovereign, Captain, Trollope's Victoria, Edith, Marguerite, Sir Joseph Paxton, King Edward VII., Dr. Moree, Noble, Sunbeam, Melba.

The Loganberry.

This fruit, which was introduced ten or a dozen years ago, does not apepar to have made much headway in Australia. It is probable that it requires very much the same soil and climatic conditions as does the raspberry. An English grower, writing of the fruit says:—"The true Loganberry fruits very freely, and is not at all fastidious as regards soil or position. The plants well repay for feeding in the way of surface dressings. The Loganberry is valuable for cooking purposes, and, indeed, for dessert by those who do not object to a fruit of slightly acid flavour. Given room it is a grand cropper; the fruits are then large and well coloured. I do not grow in the same way as the ordinary Raspberry,though the latter is one of the parents, the Blackberry being the other. With a well-grown Loganberry it is quite usual for the canes to grow 10 feet to 15 feet in a single season, and these growths bear fruit three parts of their length. It may be treated more like a Raspberry but the results are not so good. Few plants are more profitable than this is if it is grown as a pillar plant, or, as

(Continued on page 596).

Fruit Growing.

This is the deciduous tree-planting season, and the three main points to be kept in mind by the planter of fruit trees are:—

1. What to plant; 2, where to plant; 3, how to plant.

With regard to the first point it is absolutely impossible to exercise too great care, and after one has done so it is almost certain as day follows night that he will, in a few years, find that he has made mistakes. Such, at least, has been the experience of many fruitgrowers.

Then, if he be wise in selecting good varieties, it is more than likely the value of his choice will in some cases be nullified by planting them in the wrong place.

Sometimes fruit trees are planted where nature could not grow a respectable tea-tree. This may be all right for amusement, but it is all wrong for commercial purposes. A sane man does not start ironworks, except where there is iron ore and coal, nor does he start a barber's shop where there are no people.

To have foresight and judgment to see possibilities in new and untried localities is a different thing, and is in every way praiseworthy, and should not be discouraged because of occasional failures or partial successes. It is the attempt to carry on fruitgrowing where the conditions have been proved to be unsuitable that is to be condemned. It does not follow that because oranges will thrive that the apple will be profitable. On the other hand, it may, as a general rule, be stated that the perfect suitability of soil and climatic conditions for orange-growing is almost positive evidence that it is wise not to plant apples on a commercial scale, except for local markets.

One may go further and say that the climatic conditions of a locality may be eminently suitable for two fruits, say, the cherry and the apple, but the soil conditions may be such that the one will thrive, while the other will not. It may be the opposite side of a gully makes all the difference between success and failure in planting cherries, but where the cherries fail the apple is most profitable.

The trouble is that only local experience can be absolutely depended on in these maters. At the same time experience in one place helps the judgment, and the wider the experience in other places the less likelihood of making mistakes under new conditions.

Good advice to intending planters for profit is—Select the varieties of fruit which are known to best suit the conditions, or, if set on planting a given variety, search until you find conditions which are proved to be favorable.

When the intending fruitgrower is only planting for amusement or home use no such difficulties are in his way. One may obtain much pleasure, and, maybe, profit also, from growing fruit under conditions absolutely absurd commercially, but if one is adopting fruitgrowing as a calling he should make a business of it, and conduct it on business principles.

The third point, how to plant, is important, but any gardener can show a man how a tree should be planted. It should be neither too deep nor too far out of the ground. The soil should be well prepared, the roots well spread out, and the soil well firmed round them, but left loose on the surface.

One frequently hears the opinion expressed that except in very wet districts the best time to plant deciduous trees, such as apples, pears, peaches, apricots, almonds, plums, &c., and also vines, while the ground is warm, and the tree has a certain amount of growing vigour, which will enable it to take hold of the soil before the dormant period. It is questionable if trees are ever quite dormant under general conditions in Australia. Almost certainly the almond is not, and quite possibly there is some root action even in others.

One often hears discussed the question, whether or not it is necessary to dig holes for the planting of fruit trees, meaning large holes 3 ft. square and 2 or 3 ft deep. It is probable that the better the preparation of the soil the better the results, but I would sooner plant trees in land ploughed or dug well 8 in. deep all over than in mere holes, which in clayey soils are apt to confine root action to the worked land in the hole rather than encourage the roots to spread.

For planting a commercial orchard the wiser plan is to subsoil plough the whole area, work the soil down well, and just dig the hole large enough to put in the tree. In poor soil a handful of bonedust around the tree will give good results and prove profitable. As a rule this is not necessary, but in some districts it may be; but where the trees have a tendency to grow too vigorously manure should on no account be used.

It is impossible to emphasise the advice to plant only the sorts which suit existing conditions. Even a second rate apple, thoroughly suited to the soil and climate, will prove more profitable than the best apple which does not thrive or crop well. But choose the best if it will do, and stick to it, for the best cannot be beaten.

There is no best apple for all conditions, but there are many best apples for many conditions and markets That is where experience comes in, and unfortunately one cannot get it ready made as he can a pair of boots.

— Distance Apart. —

This depends somewhat on climatic conditions, but chiefly on method of training. Anywhere where the conditions are suitable for apple-growing trees may be planted at any distance from 12 ft. apart up to 30, just according to the system intended to be followed.

With low-trained, stiff, spur-pruned trees 14 to 18 ft. is far enough to allow of proper cultivation with two-horse teams; but with big, spreading trees wider distances are necessary.

Orange Tree Dying.

Reply to "Washington":—The trouble is probably some form of collar rot. The soil should be opened up at the base of the stem, and if there is some sound bark treat in the following manner:—First, cut away all the diseased portions, putting the refuse in a bucket to be burned. Then swab the whole of the base of the tree with 1 part carbolic acid to 20 parts of water, at the same time sprinkle the soil all round the hole with the same solution. Repeat the operation in a few days, and then paint the portion from which the bark has been cut away with coal tar. Instead of carbolic solution you may swab the wound twice with 1 lb. bluestone to 1 gallon of water, and afterwards paint with tar. Leave the base of the tree exposed to the air. If the trees are too far gone and have no sound bark to work on, better have them out and plant something else, not of the citrus family.

How to Earth-up Celery.

This is an important point in connection with celery culture, but before it can be treated in this manner, it is, of course, necessary that there should be a robust growth, and the plants must be growing away freely before it is possible to take them in hand. It is useless to begin earthing-up the celery until there is several inches of clear stem available to commence the bleaching process, so that unless the plants are in such a condition they may be left alone for a little while longer.

Earthing-up should be done on a fine day when the soil is in a fairly friable condition, so that it can be handled more easily. Should the soil in the garden be heavy and retentive in character, it is a good plan to work in some light and sandy material to make the soil more friable. The older method of earthing-up celery was simply to place soil round about the "sticks," doing this with the greatest care so that no particles of earth reached the heart. "A satisfactory and simple method to adopt," writes "The Garden," "is to tie round the plants thin cardboard collars about 6 inches in width. Should it not be possible to obtain cardboard, use strips of brown paper of similar dimensions. If the plants are tied round at intervals of each 6 inches of growth, bleaching operations may be carried out with considerable success and perfectly blanched specimens grown. The tie should be in the centre of the brown paper, or, if time and material are of little import, two ties may be made round the same piece of brown paper, one at the bottom and the other at the top, and the earth roughly packed round the now protected plants. If left in this condition for a week or two, the plants, assuming they are watered freely and liquid manure applied in order to promote rapid and satisfactory growth, will then be ready for the second tie. It is well to point out, however, that the plants should not be tied too tightly, and sufficient space left for the growth to expand. In the course of time it may be necessary to make a third tie."

It is not necessary to bank the earth along the rows as the tying is done, in fact, the earthing-up of the first six inches may be left until the second tie is made. There do not appear to us to be many advantages about this plan, and certainly some disadvantages. A system said to be largely adopted in America to avoid the labour of banking up is to use long light boards about 15 inches wide, and place these on edge each side of the row, and close against the plants. These boards being held in position either by stakes or by clamping hooks. It is not, of course, necessary to provide enough boards to do the whole area at once, if sowing and planting out is arranged so as to secure the maturity of the plants over the full season. Other growers use earthenware drain-pipes of a diameter and length suitable for the variety grown. When the plants have made some growth the pipes are placed over them, with the result that they grow rapidly towards the light and the head, spreading out as soon as it reaches the rim, darkens the interior of the pipe and completes the blanching process. In both methods a furrow is usually turned towards the row and the boards or pipes placed on the ridge thus formed. Either method is worth trying by the amateur, but it is very doubtful whether either will secure the same nutty flavour and crisp texture that the old fashioned plan of earthing up with good friable soil did.

Mushrooms.

At a recent meeting of an English Field Naturalists' Society an interesting paper, dealing with various fungi, was read. Alluding to the nutritive value of mushrooms, the writer stated that it was to be feared that even lovers of mushrooms did not thoroughly understand how valuable the mushroom was as an article of food. While it held a high place in the menu of the epicure as a delicate and dainty dish, the fact must not be overlooked that as a wholesome and nourishing vegetable it had no equal. No other vegetable contained so much flesh-forming material. They had heard a great deal of the advantages of a vegetarian diet, and should the time ever arrive when meat would be tabooed, the loss would be fully met by a more steady use of the despised fungi. He claimed consideration for the common meadow mushroom, which, he said, was the democracy of the fungi world, and made no pretence to be other than what it really was.

Those who dance must pay the fiddler, which is but another way of saying that every man must reap his own wild oats harvest.

* * * *

When a man gets a pain the whole township knows it; but a window may have several panes all at once without making any fuss about it.

(Continued from page 593).

many could grow it over an archway. Care is required to protect the new growths. Each year they spring up from the base, and are the fruiting wood for another season. As soon as the fruit is cleared, the old canes—those that have borne fruit—are cut out and the new ones are trained in to take their place. The stronger they are, the more fruit will be obtained the next season. The plants increase yearly in size and fruitfulness, in a rich soil.

The fruit is much liked in a preserved condition; it is less sweet than the Blackberry, and is quite distinct from the Raspberry. If planted in rows like the Raspberry, it is best to train the shoots along wires or supports, not in an upright position, but horizontally, as when trained along wires more room can be given. Planting is best done as early in the winter as possible, as the Loganberry is early in starting into growth When the plants are well established the best growths only at the base should be retained.

The Loganberry is well worth trying, even on the plains.

retained.

Oil Emulsion.

From Bulletin 18, W.A. Dept. of Agriculture.

Oil emulsion used as a winter spray for deciduous trees has proved to be one of the most effective treatments for combating insect pests in the orchard, especially when dealing with woolly aphis and red mite, and the object of this pamphlet is not to warn growers against using oil as a spray, but to point out the dangers which attend unskilful or careless application. Also it is not intended here to advise orchardists which of the many spraying oils now advertised are best to procure for spraying purposes, for the advice tendered applies to all spraying oils, whether residual oil, crude petroleum, kerosene, or any other. Any of these, if applied at the wrong season, or if badly emulsified, will seriously damage fruit trees.

— Season. —

The best time of the year to apply an oil spray is when the trees are thoroughly dormant, from about the middle of June to the end of July. The practice now much in vogue of doing the greater portion of the spraying in August is to be deprecated when oil is being used; for in this State (W.A.) there is a danger of a week or two of hot weather in September, and should hot sunny weather supervene just after the trees have received a coating with oil emulsion the trees will surely suffer. The action of the hot sun on the oiled bark frequently results in fermentation of the sap, and when this occurs trees are either killed outright or many limbs and shoots are destroyed.

— Preparation. —

When an oil emulsion is being made, the procedure is practically the same with all brands so far as making the stock is concerned, and this is :—Add one pound of soap to one gallon of "rain" water and boil; then remove from the fire and add one gallon of oil to the boiling soapy water and bring the mixture to boiling point, being careful to remove it from the fire before it rises over the sides of the vessel, because, of course, the oil is highly inflammable. Soft rain water should always be used in making the stock. As soon as the emulsion is taken off the fire it should be agitated thoroughly for five or ten minutes; a small hand pump or a syringe being very suitable for this purpose.

Then the stock should be broken down to the required strength with "hot" water and the spray applied while it is warm. Special emphasis is laid on the necessity for using "hot" water, because some of the firms dealing in spraying oils have advocated the use of cold and this is quite a mistake. The mixture remains in a more thoroughly emulsified condition and damage to trees is much less likely to ensue when hot water is used.

Wherever it is possible to obtain it, rain water should be used for breaking down the stock; but in many large orchards this is not practicable, and where brook or well water is used, the addition of a little washing soda dissolved in the water will be found to have a good effect.

The quantity of water to be used in breaking down the stock depends entirely on the sort of oil, and this information is always supplied by the vendors.

Soft soap is generally used for making the emulsion, but the one and only advantage this possesses over common bar soap is its cheapness, soft soap being purchased at a quarter, or less, of

the price paid for hard. Alkali (in the form of caustic potash in soft soap, and caustic soda in hard) is the ingredient in soaps which, combining with both oil and water, enables an emulsion to be made, and the reason hard soap makes the better emulsion is because it contains a greater proportion of alkali than is contained in soft soap. If the expense of using hard soap throughout a large orchard is too great, half hard and half soft is a good substitute.

— Application. —

As mentioned above, the spray should be applied when quite warm, and care must be taken to agitate the emulsion during the whole time of pumping. If the agitator affixed to the pump is not sufficient for the purpose, a dasher should be made (a board screwed on to a broom handle will do) and used from top to bottom of the mixture by the man who is pumping. It is necessary to draw attention to this because the agitators on a great many pumps have been made with the ihea of preventing sediment and are fastened near the bottom of the spraying vat. This style of agitator is quite useless for oil, because the tendency of oil in water is to rise, and an agitator is needed which will continually force down the rising oil.

One of the points in the application of an oil spray, least known and yet one of the most important, is that the residue in the bottom of the spraying vat should not be applied to the trees nor should it be allowed to accumulate. This is especially the case if the vat to which the pump is attached is a large one, for no matter how well an emulsion is made there is nearly always a certain amount (it may be only small) of oil which has not incorporated and this oil floats on the surface. As the spray is pumped first from the bottom of the vat it follows that whatever free oil is floating on the surface will, as the pumping proceeds, sink lower in the vat until the last gallon will contain a large proportion of free oil. If orchardists who have injured their trees with oil take notice they will find in the great majority of cases that the damaged trees are those which have received the residues from the spraying vat.

The correct and safe nethod is to empty the last gallon into another vessel before refilling the vat, and when sufficient of these residues have been collected, treat them as oil, and emulsify in the same manner as when making the stock.

When trees are being heavily dressed, it is an excellent plan to heap the soil around the stems before commencing to spray; this soil absorbs the emulsion which runs down the stems and can be thrown away from the trees as soon as the spraying is completed. In this way the dangerous accumulation of oil so often noticeable around the butts of the trees can be prevented.

— Varieties of Trees Most Easily Injured by Oil. —

Peach trees are the most susceptible to damage, and as a general rule it is not advisable to dress peach trees with oil. The best winter spray for these is the old, but thoroughly reliable spray —lime and sulphur. One big advantage in using this mixture on peach trees is that in addition to being a good destroyer of most insects it is also an excellent preventive of diseases, such as leaf curl, shot hole, etc. Oil has no effect on fungus diseases; and it is well to mention here that lime and sulphur has no effect on the eggs of red mites, but peach trees are seldom badly affected with this latter pest. The best time to apply lime and sulphur is in August when the greater part of the winter rains are over.

A fact not generally known is that there are some varieties of apple trees much more susceptible to damage from oil than others, these are '—Nickajack, Northern Spy, Cox's Orange, and Five Crown. Quite a number of Nickajack trees have been destroyed during this winter (1911) by oil emulsions, while other varieties in the same orchards have not suffered in the least though treated in an exactly similar manner. It is advisable when spraying the above-mentioned varieties to use a weaker emulsion.

The Farm

How Animals Get Home.

One of the most striking powers possessed by animals is that of finding their way home from a great distance, and across country with which they are supposed to be unacquainted. It has long been a question whether these remarkable performances are due to a purely intuitive perception by the animal of the direction, or whether they are the results of a definite carrying out of well-judged plans. Probably the most prominent example of this wonderful power is the case of homing pigeons. The homing faculty of the pigeon is rather the result of education than of intuition. Homing pigeons will make no attempt to start in a fog, if they do get away, the chances are that they will be lost. Nor do they travel at night, but settle down at dusk, and renew their journey in the morning. The bee pursues much the same course as the pigeon. When it is loaded with nectar, one can notice it cease humming about the flowers and spring up in a swift vertical spiral, and after circling about a moment, shoot homeward "in a bee-line." Evidently it has "got its bearings." How a bird like the albatross, swinging on tireless pinions over the tossing ocean, suddenly rouses its strength and traverses in a day or two the hundreds of miles between it and the rocky shores where it builds its nest, is not easily explained. Nor can we readily understand how once a year certain fish come back, not to the coast alone (for that would be no more than an ordinary case of migration), but to the identical stream where they were born.

Remarkable cases are well authenticated throughout Australia of mules, horses, donkeys, camels, and cattle making back straight across country to the actual locality of their birth. Only two conditions seem necessary to enable any one of the above species to perform these feats—an absence of fencing, and an available supply of feed and water en route. Camels can take on this class of journey at any time of the year, winter or summer; but all others are dependent upon the state of the season for travelling. The most common instances of homing ability are presented by domestic pets, which return home in a most extraordinary fashion.

It appears, indeed, that brutes, equally with men, become homesick. Those that stay away, as well as those that return to their former homes, show this very plainly, and often pitiably. This feeling is the motive that leads them to undergo perils and hardships that no other emotion would prompt them to undertake, or enable them to endure. But it is the most thoroughly domesticated and most intelligent breeds of animals that this home-sickness attacks the most severely, while correlatively the most difficult feats of finding their way home are manifested by the same class. It is the finely-bred horses, the carefully-reared pigeons, the highly-educated breeds of dogs that return from the longest distances and over the greatest obstacles. This would seem to indicate that the homing ability is largely the result of education. There would seem to have been no call for such an instinct in the wild animal.

The far-reaching eyesight of birds is well known. Kill a goat in the Himalayas, and in half an hour flocks of vultures will be disputing over the remains, though when the shot was fired not a speck blotted the vast blue reach of the heavens. Eyesight must play an all-important part with the homing pigeon, just as a keen sense of smell does with the dog. But after making due allowance for superiority in these two faculties over those of human beings, one is forced to admit that they, and many other species, possess a more acute sense of direction, enabling them to keep the points of the compass straight in their minds better than mankind can. It would seem as though in all instances of home-sickness animals rarely or never attempt to make back without having a definite idea in their minds as to the route, and hence they almost invariably succeed, otherwise they do not try.—Elder's Review.

The Lincolnshire Curly-Coated Pig.

With the Berkshire, Tamworth, large White Yorkshire, and the Essex breeds of pig almost every farmer in the State is more or less familiar. There are, however, a number of old-fashioned breeds which one rarely hears of in modern times, notably the Irish Grey, and the French.

The Fenmen and Marshmen of England are by far the largest breeders of pigs. Many have bought other pure or other cross-bred pigs to fatten, but all finally and emphatically declare that Lincolnshire Curly-coated pigs pay best. They are frequently fed in the open on the marsh-lands in herds of a hundred or more, with no other shelter than that afforded by the straw stacks, and it is the opinion of all who adopt this method of feeding that the animals are far better and healthier than when they are kept in warm covered yards. They come early to market as porkers or as large

bacon pigs, and being a general-purpose pig are practically fit for slaughter at any age. The compiler of the Herd-book expresses himself as assured that few pigs, if any, have a longer history of pure breeding than this Lincolnshire type. Having been pure as a type for over a century, it is able to transmit its valuable characteristics and merits to its progeny with a degree of certainty which would not be the case were it recently evolved.

These pigs are generally farrowed in their native county in March and April, and those not kept for breeding are fed. At nine to twelve months they weigh up to 420 lbs. The sows are prolific, make very good mothers, and are usually fed after having had one litter, and at twenty months old weigh 560 lbs. and upwards. In Lincolnshire—owing to the fact that so much pork is allowed to foremen, shepherds, herdsmen, and horse drivers, in lieu of wages—there is a great demand for large fat pigs. The labourer who also feeds a pig for his own consumption invariably chooses this breed to any other.

As regards the points of the typical Lincolnshire curly-coated pig, the animal should be white, and coated with white curly or wavy hair (odd blue spots are not infrequently found upon the skin). Head not too long, nose straight and not dished, ears thick and pendent, but not falling over the eyes, with a fair distance between them, jowl heavy, shoulders deep, and wide at heart, ribs well sprung, back straight and long, tail well set. The sides are deep, reaching nearly to the ground, belly-parts thick, and the whole carcass well-supported with lean flesh, hams well-filled to hocks, and standing on short, straight legs, with plenty of bone.—Elder's Review.

Feeding the Cow.

We want a cow to eat all she can assimilate and put it in the milk pail. This is accomplished, first, by giving food that is adapted to the production of milk. One cannot give her a ration that would fatten a beef animal and expect her to produce the maximum amount of milk. The ration must be properly balanced, having in view the production of milk. It should contain a certain amount of protein and a certain amount of carbo-hydrates. It must be palatable to assist digestion. Thousands of farmers expect their cows to make butter on nothing but straw. While plenty of roughage is necessary there must be plenty of concentrated food to go with it. Succulent food which is so much more easily digested than dry food is also required.

The chemist says when we cure hay we take nothing out of it but water. But everyone knows the difference between eating a rich, juicy apple and the same apple after being dried. There is something lost besides water; the chemist cannot measure it, but the cow and the man can. I do not know of any better succulent food than silage.

Something that is often neglected is regular and sufficient watering. We water horses three times a day, whether they are doing anything or not. A cow giving any considerable quantity of milk, drinks 75 to 125 lbs. of water It is impossible for her to take all that at one time, and it is not possible for her to give the maximum amount of milk unless she has that amount of water, as water constitutes 87 per cent. of the milk produced.

I am often asked how many times a day a cow should be fed. A cow does not eat in the ordinary acceptation of the term. "See that cow eat." She is not eating at all; she is simply gathering food into a storehouse to provide her with a good square meal, and if she did not afterward eat the food so stored she would starve to death. After her storehouse is filled she retires to a quiet place to eat it. We say she chews her cud; but she is really eating. I do not care how many times you feed her, so long as you do it regularly. Only give her enough, so that she can chew the cud all the time she wants to. In that way she will make milk econonomically.—J. S. Woodward, N.Y., in The American Agriculturist.

Twin-Foals.

The disappointments that mares have caused their owners by the production of twins have been very numerous, and not at all confined to one breed. In thorough-breds, shires, hackneys, and ponies such undue prolificacy may be about equal; but it is easier to trace the misfortunes of the thoroughbred in this respect. Such investigations, too, may be useful in dissipating certain erroneous ideas. It has been said that if born of different sex twins will be sterile, but that view has been entirely refuted. Then, again, it is contended by some that the foals must not only be small, but that the produce of a twin must also be diminutive, either as regards the horse or the mare. Of that there is no proof; but there are certain cases to show entitely different results. That mares that once produce twins are predisposed to do so again is, unfortunately, shown to be true.

Kale.

There are many kinds of kale, but all are merely varieties of the cabbage family. Some varieties grow much taller and stronger than others, and the "thousand" headed kale grows very strongly in good soil, with moisture, and produces a number of heads. The green leaves may be continually pulled off when big enough, and the plant thus produces a great quantity of succulent green food. Seed should be sown in a bed the same as cabbage and planted out in rows three feet apart and two or three feet apart in the rows, using plenty of manure on the ground. The growth will depend on the water and manure it receives.

A bore: One who talks so much of himself that he gives you no chance to talk of yourself.

Judicious Tree Planting for Shelter.

The subject of the intelligent and systematic cultivation of timber trees by farmers for their own economic benefit is one that has been neglected seriously in the past, although it has for long engaged the earnest attention of many persons whose habit of thought induces them to endeavour to reduce sound theories to sound practice, says "Rural World." I do not speak of afforestation, but rather of aboriculture; for the aim of afforestation both in kind and degree is essentially different to the aim the farmer has—or ought to have—when he is led to plant up some shelter belts and screens either independently or in conjunction with his neighbours, that is, co-operatively. I would like to consider my subject as concisely as possible under the following general heads, viz.:—

1—The influence of shelter. 2—The utilisation of waste ground. 3—The utilisation of waste labour. 4—The improvement of the soil. 5—Humidity and evaporation. 6—Extraneous crop incidental to timber cultivation. 7—The ornithological benefits accruing. 8—The artistic or humanitarian benefits.

In the majority of cases the provision of shelter on a farm is left to chance, or the contiguity of physical features of various sorts, and stock are left to make the most of these as they occur.

— Adequate Shelter on a Farm —

is said to have the effect of removing that farm three degrees further south with all the advantages that ensues. It is really not too much to say that the same attention should be given to the proper planning and distribution of natural shelter in the construction of a farm as is given to the proper planning, construction and maintenance of fences, buildings, etc.

This neglect is extravagant and wasteful, for it is an axiom in the science of stock-raising that suitable shelter enhances the market value of the animals. It is within the mark to place this increased value at 10 per cent., which means that a small farm raising £100 worth of cattle in the year would increase its revenue from this source to £110, and the value of £10 capitalised is equal to over £250. This is surely not a bad return from an outlay of perhaps £5 or £10 in providing the cheapest of all outdoor shelter.

My cardinal advice always is to plant densely, for it is easier to pull trees up than to plant them. It is necessary to again emphasise the fact that this is not forestry, nor is it meant to be, for while a farmer may with reasonable intelligence grow a certain quantity of really sound, good timber that may be used for his own and local purposes, he cannot expect to grow high-class wood, which can be grown in bulk only on suitable land and by high-class methods when it has to compete in quantity and uniformity of quality with the timber trade of the world. As

— One Example of What Might be Done. —

of many that might be cited, we will take the case of pasture land at present lying exposed to all the winds of heaven. The object of course to be aimed at is to produce shelter that will as far as possible protect the stock in all weathers, and afford them shade on sultry summer days.

Cheese-Making Value of Milk.

— Points Different from Butter Making. —

In estimating the value of milk as to its cheese-making powers, points have to be considered which are quite different from those which are taken into account when the butter-making yield is the point considered. A consideration of the constituents of milk which are utilised or lost in each of the two cases will make the difference apparent. Milk consists essentially of fat, casein, sugar, water, and ash. The disposition of these constituents in the manufacture of cheese is what can be easily considered.

The first operation which has a definite effect upon them is the renneting, which is performed on the milk after it has been raised to a suitable temperature. Rennet consists of a solution of an unorganised or chemical ferment which, at a suitable temperature, has the power of producing coagulation of the milk. The curd produced when rennet is used, is somewhat elastic and tough, but never greasy, and entangled in it is some of the calcium phosphate of the milk which is included in the "ash." When the curd is firm enough, it is cut up, and the whey then rapidly separates from the curd. Of the substances mentioned as constituents of milk, there are two which are most utilised by the cheese-maker, the fat and the casein, with a very small quantity of the sugar and the ash. If the whey is examined after it has separated, as mentioned above, it is found to contain a very large proportion c

the sugar and some small quantity of the nitrogenous matter which the curd fails to retain. This is called albumen, and passes into the whey in a soluble state, from which it can be separated if necessary by boiling the whey; the albumen is solidified by the heat and appears on the surface in the form of a skin.

— As to the Fat, —

a very large proportion of this should be left in the curd, but the exact amount depends on the handling of the curd by the cheesemaker. If the curd has been roughly treated, and badly broken, the whey will be found to be milky in appearance. This indicates the presence of fat which ought not to be there, since its presence in the cheese improves its quality. If the whey appears as a clear, green-coloured liquid—which is the proper colour—this indicates good and careful manipulation, and shows that but little of the valuable fat is lost, but that all will be present in the cheese. Generally speaking, only half of the total solids (that is, all but the water) are utilised in the cheese, the other half being lost in the whey. Hence arises the value of the whey if it be used as food for stock, though what it contains is thus lost so far as the cheese-maker is concerned.

— Quality of Milk. —

I have frequently heard the idea expressed that with cheese-makers good quality in milk is not so absolutely necessary as with butter makers. This is seen, however, from the above, to be quite erroneous, since the larger the amount of total solids in the milk, the greater is the amount which enters the cheese, and the less there is in the milk, the less there must be in the cheese. If we consider the fat alone, cheese consists roughly of one-third fat, hence this constituent goes to increase the weight, and it further also mellows the cheese, and so improves its quality as well. Further, the more fat there is in the cheese, the more casein will be found in it, as these two constituents vary in proportion to one another; and hence, on another ground, the richer the milk is in fat, the greater will be the quantity of cheese obtained. Further, also, fat helps to retain water, and therefore causes increase of weight, because of this increased water.

— Size of Fat Globules. —

It would, therefore, appear that rich milk like that of Jersey and Guernsey cattle, would give the best results in cheese-making. Yet, strange to say, this does not turn out to be the fact, for this milk does not give such a good cheese as others whose fat constituents are not so high. The explanation given is that the fat globules in Jersey milk are large, and though this is of great advantage where cream and butter are the products desired, yet their very size prevent them from being entangled in the casein, and hence from forming a good cheese.

Milk which is best suited for cheese-making, is found to be that in which the proportion of fat is high, but the fat must exist in small globules, and so be capable of being held up or retained by the casein when coagulation takes place. It is the want of this capability which causes the cheese obtained from Jersey milk to be inferior to that is which is got from milk, say, from Ayrshires or Shorthorns, where the fat is present in high proportion, but is also in very small globules, though, in spite of the size of the globules, the actual proportion af fat present is not as high as in the richest Jersey milk.

There are also other breeds than Shorthorns or Ayrshires—these are merely typical—which give milk that is excellent for cheese-making purposes.—"Farmer and Grazier."

Rotation in Crops.

This much-discussed subject cannot be worn out so long as it is quite ignored by so many farmers who continue to plant same crops on the same land year after year, with constantly diminishing yield, entirely oblivious to the fact that the productiveness of the soil is fast being exhausted. This is not altogether on account of the drain upon the fertility of the soil, for that is usually kept up by the application of fertilizers, but it is produced by the mechanical condition of the soil caused by the certain methods of cultivation required by the crops thus continually planted. The soil becomes cloyed or glutted with certain elements of plant food left in it by the plants that have been grown therein year after year, and a change in crops is absolutely necessary to restore it to its full productiveness.

Rotation in crops has been demonstrated as being excellent for the recuperation of the soil, as the continual growing and gathering from the same field of a harvest of the same kind of product will in time deprive the soil in that field of the ability to produce that identical material, as it has taken from the soil all that is essential for the production of such crop. When crops fail of themselves, the failure can, as a rule, be traced to the neglect of the farmer and not to natural conditions. The soil is provided with a general state of richness. If continual demands are made upon it to produce a certain kind of crop, and no return offered in the way of remedies for its degenerating tendency, the outcome will be a thin crop from a fertile soil exhausted for the production of that particular crop.—Exchange.

A good flock of sheep is the most effective scavenger that can be placed upon the farm in destroying weeds and saving grass.

Preservation of Timber.

— Seasoning of Timber. —

The question of seasoning necessarily requires consideration before the use of preservatives is dealt with, since proper seasoning not only prepares timber to receive the preservative treatment, but under certain conditions may be in itself a means of increasing its durability.

Contrary to general opinion, it has been found that the shrinkage taking place during the seasoning of poles is very slight, amounting, in seasoning from green to air-dry condition, to about 0.1 in. or 0.2 in. in the circumference at the butt end, and from 0.15 in. to 0.25 in. in the circumference at the top end of poles. The loss in weight during such seasoning is found to be ordinarily from 16 to 30 per cent. of the original weight.

The rate at which wood seasons is found to depend chiefly on climatic conditions, timber cut during spring and summer becoming seasoned, as a rule, much more rapidly than that cut in autumn or winter. Soaking the timber in water, the degree of exposure to the air, and the method of piling the timber also affect the rate of seasoning. Timber which is seasoned rapidly is much more liable to split than that which is seasoned more slowly. In the latter case numerous small splits are formed, but these close again when the wood absorbs moisture, and apparently no detrimental effect is caused. If, however, the wood seasons rapidly, wide and deep splits may be formed, which do not again close, and which not only decrease the strength of the timber, but materially hasten decay by allowing the entrance of insects and fungi.

— Application of Preservative with a Brush. —

A very simple method of using a preservative is to apply it to the surface of the wood with a brush, but while experiments carried out in this direction by the U.S.A. Forest Service have given good results, this form of treatment does not present a complete solution to the question of timber preservation. It is especially useful, however, where the erection of even the simplest plant would not be justified, as the cost is very low.

In experiments with creosote a penetration of from ⅛ in. to ¼ in. was obtained in seasoned timber. Applications of carbo-lineum, creolin and tar were also made with a brush, the absorption of tar by 6 ft. of 8in. pole being on an average about 7 lbs. Care should be taken in this method to fill all splits formed during seasoning; the preservative should not be applied when the surface of the wood is wet or when very cold. In most cases better results will be obtained by heating the preservative before applying.

— Treatment by Immersion. —

Immersion in a tank filled with preservative has the advantage, in common with the brush method of application, that the butt end only of poles can be treated, and the expense is avoided of applying the preservative to the portion above ground, which in many cases is sufficiently durable without treatment. The treatment consists in subjecting the timber to successive baths of hot and cold preservatives, these latter being thus driven into the wood by atmospheric pressure. Three methods of procedure are possible:—(1) After the timber has been held in the hot preservative for the required length of time, the heating may cease, and without other change the whole be allowed to cool; (2) the timber may be transferred from the hot liquid to another tank containing cooler preservative; and, (3) the preservative may be changed, the hot being drawn off and colder preservative run into the treating tank. The hot bath, as a rule, simply prepares the wood for treatment, absorption taking place, except in the case of very dry and porous woods, during cooling.

The length of time during which the wood must be kept under treatment is dependent among other things on the species and condition of the wood. Thus where the sapwood is narrow and the heartwood difficult of penetration, the treatment should be discontinued after the sapwood has been impregnated; and where the sapwood is wide, the period of treatment must be arranged so as to avoid an unnecessarily large absorption of preservative.

In the case of porous woods a relatively deep penetration is obtained as compared with the quantity of preservative absorbed by shortening the cold bath and removing the wood while the preservative is still fairly hot.

As regards the condition of the wood, it was found that the drier the wood the more readily it may be treated. The absorption of preservative by green timber is small and irregular, and the treatment of unseasoned timber is unsatisfactory in addition, on account of the liability of such wood to split in drying, and thus expose untreated wood to decay. Where it is decided to treat wood not thoroughly seasoned, the temperature of the hot bath of preservative should be high, about 215 deg. F. to 230 deg. F. Experiments carried out by the Forest Service on wood which had been soaked in water before seasoning showed that the wood was not rendered any more permeable to preservative by such treatment.

— Increased Durability as a Result of Treatment. —

The results of the tests indicated that an average increased life of at least three years may be expected from applications of preservatives with a brush. The cost of applying two coats of creosote to 6 ft. of pole (including cost of labour) is estimated on the average at about 10d., and it is computed, therefore, that if the pole has an increased life of one or two years the cost of treatment is amply repaid.

The application of creosote by the tank method will, it is stated, so preserve the end of the pole that the life of the pole will be the life of the top.

Preservative treatment pays better where the wood has very little natural durability than where it has naturally a large durability; the use of wood for poles, posts, gates, etc., which would otherwise be unsuitable is thus rendered possible.

In spite of the fact that she seems so demure and amiable, the cat is a constant tail bearer.

Green Fodder.

Of all forms of green meat, lucerne, grass, and rye-grass are of most value. They are nourishing, and, at the same time, safe foods, especially the first two named. Some people pin their faith to tares, and they are distinctly valuable, especially for cart horses, while as an alternative in many cases of irritation of the skin and blood they seem to be useful enough. Some care should be exercised, however, in their use, and it is not perhaps as well known as it should be that when they get old they are astringent, and a decidedly heating food, approaching peas in composition as the pods grow in size and the corning process goes on. Young tares, on the other hand, are useful to freshen up old horses, and are relaxing. Another point should be noticed in connection with tares, that they, in common with all kinds of clover, are apt to affect the kidneys, if not carefully used, owing to an acrid principle which they contain. For this reason the other green foods mentioned above are more suitable for sick horses, as they are harmless in this respect.

All green food loses much of its value when it gets old, and rye grass is said to cause scour in this stage, but it suffers less than other grasses from late cutting, and, providing it does not become dead ripe, it improves in quality. Analysis proves this, and also the experience of feeders, although the contrary is the case with other grasses. Lucerne, especially, should be cut in good time, or the stems will harden, and the value be much lowered. In fact, it should be cut before full flowering; if not it may prove too fattening, like clover, which will soon put on flesh, whether fed green or as hay. Green clover is not a cooling food, and, if this is the object sought, one of the other fodders mentioned should be used instead. The amount of green food, or the carrots and similar food which horses require, is largely dependent on the watering. Stale green fodder is very undesirable, and is apt to bring on colic and intestinal disease, from its rapid decomposition. The plan of chaffing hay along with green fodder until the animals have got thoroughly used to the latter is an excellent one, sometimes adopted for farm horses for a few weeks, and its extended use, though laborious, would tend to save many a horse that pays a dear penalty for greedy feeding in early summer.—Exchange.

Close Breeding.

Careful selection and inbreeding have greatly improved all breeds of domestic animals throughout the civilized world. But few pedigrees can be traced that do not run into one or two progenitors of the whole.

The surprise is that such animals retain their constitutional vigour, but, happily for cow breeders, the test of butter production seems to be also the test of vigour, as the best cows are those that are vigorous and capable of digesting and assimilating sufficient material with which to accomplish the purpose desired; yet, with all the care that may be exercised in the matter of selection, the animals that prove superior are few compared with the number that are not so profitable.

The result of inbreeding may be plainly noticed by even the most casual observer in the delicate shape and structure of Jersey cattle, but the appearance and form are now considered badges of purity of breeding. The beef-producing, butter-yielding, and milk-giving breeds differ in form and characteristics. While a few breeds may possess more than one desirable quality, it is not considered advantageous to attempt to combine all the good qualities in a single breed. The risk is too great. The cow that daily satisfies her owner in a single respect only has as much as she can do. If something else is required, procure or breed a different kind of animal, as each farmer can, at the present day, breed for what he prefers.—Exchange.

Arab Horses.

The Arabs consider that a horse "is really noble (of pure descent) only when, in addition to fine configuration, he unites courage with fire, and bears himself proudly in midst of battle and danger. Such a horse will love his master, and, as a rule, will suffer no other person to mount him. He will not yield to the wants of nature so long as his master is on his back. He will refuse to touch what another horse has left. He will take pleasure in troubling with his feet whatever limpid water he may meet with. By the senses of hearing, of sight, and of smell, as well as by his address and intelligence, he will know how to save his master from the thousand accidents that may befall him in war or at the chase. Finally, sharing the emotions of pain or pleasure experienced by his rider, he will aid him in the combat by combating also, and everywhere, without hesitation, will make common cause with him. Such are the tokens which evidence purity of race."

The mealy bug is destructive, the pumpkin bug is as bad, but the humbug beats them both.

Berseem.

Some time ago Professor Perkins reported of this winter fodder grass. There was always, he said, a scarcity of feed for dairy cows in the winter, and on June 16th—10 weeks after the seed was sown—the clover was 15in. high, and a start was made cutting it and feeding it to the cows. Since then the grass had increased in height to 18in. For the first week 27 milking cows were fed on the clover regularly twice a day, and for the next three weeks 24 milking cows had been fed in the same way. Only half an acre had been cut for that purpose during the four weeks, and the fodder weighed 6 tons 11 cwt. 72 lbs., being an average of 13 tons 3 cwt. 34 lbs. per acre. That was heavier than the heaviest crop of ensilage ever grown at the college. The ensilage yielded 11 tons 18 cwt. to the acre, and the heaviest crop of peas and vetches he had grown only weighed 9 or 10 tons when cut in the bloom. In the case of the Egyptian clover the yield was over 13 tons before the crop had matured. The great point in its favor was that it had grown at a time when rape or barley would not make any headway. Some years ago the same grass was tried in South Australia, but was pronounced a failure. The reason of that was probably because they did not know how to handle it. It should not be allowed to flower, but should be cut regularly. Practically the whole of the live stock in Southern Egypt was fed on that grass during the cold months, and then it was replaced with some summer crop. He believed it would be a valuable fodder for the Murray swamps. From the small experience he had had with it so far he knew of no crop that would give such good results in the winter. He had doubts whether it would be a good grass for grazing on, because it was very succulent. At Roseworthy he had sown about 60lbs. to the acre, which was treated with 2½ cwt. of superphosphates. That was too much seed, but he had put in the extra quantity because there was some doubt whether the seed was all in first-class order. Forty pounds to the acre would be plenty It should be sown thicker than lucern, as it did not branch well.

Chewing the Cud.

The simple facts of this interesting process are these in the order in which they take place—

The food is hastily swallowed and goes into the rumen, or large sac, which has a capacity of several bushels. Connected with the rumen, or large sac, is the recticulum, commonly called the honeycomb, on account of its cellular lining, and this is a mere adjunct of the rumen, and appears to serve the purpose mostly of a reservoir of water, by which the food is moistened and reduced to a fine pulp between the leaves of the next compartment, called the omasum or manyplies, so called because of the numerous leaves, with which it is furnished, and between which the food is ground into a soft semi-fluid pulp. From this the food passes into the abomasum, or true digestion stomach, in which it is partly dissolved by the gastric fluid here secreted.

Now let us go back to the food hastily swallowed by a ruminating animal. Right at the junction of the three first divisions is a curious bit of machinery called the esophageal groove. This is a small sac or tube a few inches in length, which connects the first and second divisions of the stomach with the third. This groove has a slit in it, through which the hastily-eaten food —moistened by the water in the recticulum—is forced by a contraction of the stomach, easily visible

when the cow is ruminating, into this small canal, and by a process of regurgitation is carried to the mouth. This small quantity of food is the cud. It is simply a wad of food forced, as described, into the mouth, where it is chewed in leisure and with evident comfort and pleasure, by the healthy animal. Being reduced to a semifluid condition, it is swallowed and goes to the omasum or manyplies between which it is macerated into a fluid, which then goes to the fourth part of the stomach, where it is mixed with the gastric fluid, the solvent of the food, and then becomes nutriment, completely, when acted on by the bile in the duodenum.

Lung Worms.

The method in which sheep "lung-worms" reproduce themselves is curious. The young of these parasites escape from the lungs of infected sheep, and become scattered over the pastures, etc. They are then swallowed with the grass or water, and find their way, probably, says Curtice, "through the blood stream" into the lungs of the sheep. Arriving at the extreme ends of the bronchial tubes they break down some of the tissues, and become encysted. In the cyst they grow to adult size and develop sexual character; then, escaping from the cysts, they make their way into the small air-tubes, where the sexes mate and reproduce. The eggs are then laid, and these hatch into young worms, which find their way into the lungs, whence the sheep coughs them up, and the whole process begins again.

Preservation of Manure.

The loss from the manure is chiefly one of nitrogen, which passes off as ammonia. Several preservative agents have been tried which, when mixed with the fresh manure, either combine with the liberated ammonia, thus preventing its volatilization, or have the effect of reducing the bacterial action which results in the formation of the ammonia. Nearly all these agents, however, are reported as being too costly to be satisfactory. Gypsum (calcium sulphate) is one of the materials that has been longest in use in this way, but the quantity required is too large for the process to be economical. Another drawback to the use of this material is that it is liable to be itself reduced to calcium sulphide by bacterial action, and this latter compound has an injurious effect on plant life. Kainit is somewhat more satisfactory in preventing the volatilization of the ammonia, but it is stated that experiments carried out in Germany have shown that the only practical method of reducing the losses of nitrogen is by placing a layer of old well-rotted farmyard manure as a basis for the new manure heap. This always resulted in smaller losses, a result which is thought to be due to the constant evaporation of carbon dioxide from the layer of old manure, this carbon dioxide combining with the free ammonia to form ammonium carbonate.—Agricultural News.

Silage for Horses.

When silage was first introduced cases of sickness in horses, attributed to its use were frequently reported, and the opinion that silage was not suited to horses came to be quite widely entertained. Evidence has accumulated, however, that good silage used with proper care is a safe and valuable food for horses.

In experiments at the Virginia (U.S.A.) Station with 8 work animals (6 mules and 2 horses), 4 of the animals were fed only hay and corn and 4 were fed silage in addition, the silage replacing a part of the corn. During a preliminary period the animals were gradually accustomed to the silage, only a small amount being fed at first, but during the last six weeks of the experiment the animals were fed all the silage they would eat. The amount consumed varied from 52½ to 174½ pounds per week—less than "is readily devoured by cattle of the same weight." The animals remained in good health throughout the experiment and gained in weight, although constantly at work except in stormy weather.

As a whole, it would appear that silage would make a good roughage for horses when used in connection with hay or straw and grain, but that the animal should become accustomed to the food by degrees, and that this is as important as when changing from old to new corn or from hay to grass. For some days, when beginning to feed silage, it is of the utmost importance to feed a very small amount at first, and increase gradually as the animal's appetite and condition of bowels may indicate.

A Farmers Experience With Sheep.

A South Australian farmer, who recently published his experience on lamb breeding, extending over a period of 20 years, strongly favours the Lincoln-Merino ewe crossed with either Shropshire or South Down rams. The ewes, he states, "are larger, quieter, and better mothers than the pure merino, and when too old for breeding are good butchers' sheep. The merino is small in carcase, heavily woolled, of a roaming disposition, and not inclined to put on fat when young. He had no trouble with crossbred sheep breaking bounds, as he made it a practice not to overstock. True, their wool was not of equal value to the merino, yet by care and attention it can be greatly improved. As a matter of fact, however, they could not get both fat and wool of the finest class on the same animal when young, and for lamb-breeders the sheep that put on fat instead of wool was most profitable. For the London market he had a strong preference for the use of Down rams, as the probeny matured earlier than the Shropshire cross.—Exchange.

If everybody were enjoined from talking about themselves and what concerns them, what a silent world this would be.

Farmers' Sheep.

The progeny of merino ewes and Lincoln rams give heavy fleeces, with fine, lengthy staple. This class of wool has brought high prices for some years, writes a Victorian farmer. They are good store and fattening sheep. The ewes are the best to breed from for any purpose. Where lamb-raising for export is the chief consideration, these crossbred ewes, mated with English Leicester rams, well ribbed and with fine bone, will produce lambs which will fatten quickly. Any lambs not sold for slaughtering would grow into good sheep for wool or mutton. The Shropshire cross is not a profitable wool-producer.

— Lambing. —

We lamb here in July. In respect to lambing percentages, ewes which produce twins will give the best percentage, but in hilly country like ours single lambs are reared better than twins, and are to be preferred. Crossbred sheep will give 80 to 90 per cent. of lambs.

Lambs at four or five months weigh 30 lbs. to 35 lbs.; merino wethers, 48 lbs. to 56 lbs.; and crossbred wethers, 55 lbs. to 60 lbs. dressed.

— Shearing and Wool-Classing. —

We shear our own sheep with machines, and also sheep for our neighbours by contract. We try to make the classes even, but this is very difficulty with the mixed lots which go through the shed. The sheep almost invariably are so uneven that too many classes have to be made.

We always go for skirting fairly heavily (unless otherwise advised by owners). We make first and second pieces, bellies, and locks. Lambs' wool is also made into two classes. In big flocks the classing would be much finer.

— Dipping. —

We dip the sheep in January, using Little's sheep dip. We find that by dipping late the fly is not nearly so bad. This year I have seen several lambs which had been struck with the fly, but the "blows" disappeared. We have used Little's dip successfully in drenching for scours. I think all sheep should be drenched once a year, in the summer.

Sheep which are regularly dipped have much brighter and healthier-looking wool than those not dipped. They seem to thrive better after dipping. Although no ticks may be present, there may be sheep-lice.

— Searing Iron Preferred. —

We use the searing iron, and are well pleased with the result. The percentage of deaths is less than by using the knife.

The Horse's Hoof.

The growth of a horse's hoof is like a finger nail, and unless it is worn off at the bottom or bearing-surface it becomes too long. If worn off too much, the sensitive portions of the foot do not have sufficient protection and the horse goes lame. In a natural state, however, the horse's hoof keeps itself perfectly proportioned. If the ground is hard the horn portion is worn away as fast as it grows. All shod hoofs become overgrown in from four to five weeks. In such cases there appears to be an excess of horn at the toe, and since the horny fibres do not grow straight down, but obliquely forward, the plantar surface of the foot is carried forward. This throws it out of proper relation with the rest of the foot, and injuriously affects every part of the foot—in fact, the entire leg.

On an average the wall will grow an inch in three months. The more actively a horse is exercised the faster the hoof grows. Inflammation checks growth. If there is no bearing on a certain part it will grow quickly and become even with the portions that receive the bearing. If the hoof be broken or rasped away to relieve pressure, in a month's time that part will be found in all probability flush with the shoe. The sole grows in the same manner as the wall, but it wears away quite differently. It never becomes overgrown like the wall, for it becomes flaky, dry, and brittle, then breaks and falls out. When the frog comes in contact with the ground it wears off in shreds. The horn of the frog is softer than that of the wall or sole, and stands work as well as either of them. As it is elastic, and rests upon a still more elastic cushion, it yields and leaves the wall and sole to bear the pain.

The growth of the frog depends largely upon the condition of the bars. If (says the Weekly Times) these are overgrown, the frog receives no bearing, and wastes away. High heels are always accompanied by a small frog, and low heels have a large frog. Horn is porous and absorbs water readily. If too much water is absorbed the horn is, of course, weakened. The natural protection to this is the varnish-like outer wall, and when this is removed by rasping, moisture is more easily absorbed, until the horn beneath becomes hard and brittle from exposure and friction, as we have already said.

Some Notes on Calcium Cyanimide.

Before calcium cyanamide can be utilized by plants, it is first transformed into ammonia, and then into nitrate of soda. These changes, under favourable circumstances, are fairly rapidly effected by means of soil bacteria. Nitrification is especially rapid when the manure is applied only in small quantities at once. Very large quantities of the cyanamide applied at one time, appear to paralyse the activities of the nitrifying bacteria, with the result that transformation into nitrate of soda is considerably delayed. Experiments carried out by some French investigators showed that the retarding action was due to the influence of the cyanamide itself rather than to the caustic lime which accompanies it, and further, that although the manure should always be used with prudence, yet soils rich in organic matter can advantageously take up more of the manure than soils deficient in this constituent. The toxic effect which the manure undoubtedly exercises on the living organisms of the soil when used in large amount is reduced to a neglible quantity when employed in moderate doses.

Nitrogen does not appear to be readily lost from cyanamide in storage. When kept in sacks, and stored in a dry place, there was scarcely any loss. When the cyanamide was mixed with kainit, there was no loss even after forty-two days. With superphosphate it was otherwise, and a loss of 5 per cent. was discovered. It would therefore seem necessary to avoid making a mixture with this manure.

The paper we refer to contains details of a large number of manurial experiments carried out with various crops, such as wheat, oats, maize, pasture grass, vines, etc. From the results of these trials, the conclusion is drawn that calcium cyanamide is similar in effect to an equivalent amount of sulphate of ammonia. A normal quantity of the manure to apply per acre would be about 200 lbs. This may be given either before or at the time of sowing.—Agricultural News.

A horse will carry from 200 to 250 lbs.; a donkey 100 to 200 lbs.; a camel 350 to 500 lbs.; and an elephant 1,800 to 2,500 lbs.

The Butter Cow That Pays.

From "Hoard's Dairyman."

The judgments of men as expressed in words are worth something, but the farmer as a rule prefers to see the facts and hear them talk. Here is an array of facts. Let us see what are their conclusions. A man had heard that Jerseys were good butter cows. He bought one that was fresh in milk. He took her from a kind, considerate master, one who understood cows, and brought her home to a cold stable, and turned her out to drink iced water on a very cold day. When she came into her stable she shivered for a half hour, and in a week shrunk her milk flow. That was the measure of his judgment concerning a good cow. He told us very emphatically that he did not think Jerseys were hardy enough for this climate. That man would have judged a diamond by what he knew of limestone. What do the facts teach in that case?

Two men in this county, near neighbours, have taken milk to a creamery for twenty years. Each started with 160 acres of land. One we will call "A," the other "B."

When they started in with cows, A was in debt for nearly the price of his farm, B was out of debt. A early saw that he must have the best cow he could get. He read the best of dairy literature. B said it was all nonsense to read such blamed nonsense about the farm.

A bought the best registered bull he could get, paying £40. Twelve years ago he built a silo. That enabled him to keep more cows on the same area of land. Then he took up the study of the feeding question. B called him a crank. Now, how is it after twenty years of trial? A is worth ten times what B is. What do the facts teach there?

A New York milk producer, writing to the Dairyman, says:—

"In 1888 my cows averaged 1,000 quarts per cow, and the milk cost me 1 4-5d. per quart. Last year the milk yield was 3,754 lbs. per cow, and the cost per pound to produce milk was ¾d. per quart."

What do the facts indicate that that man had been doing to himself all those years?

The Pure-Bred Sire League.

Whilst in a general way the importance of the use of pure bred sires is widely recognised there undoubtedly remains much to be done in this matter. Rather a good idea comes from Wisconsin, U.S.A., where Professor Alexander, of the State College of Agriculture, has organized an association under the above title.

The Pure-bred Sire League has for its purpose the improvement of the live stock of the State and the nation by the use of pure-bred, registered sires, in the place of grade sires. Any owner or user of a pure-bred sire of any class of farm stock may become a member without payment of fees or formal nomination.

Upon joining the league, each member pledges himself (1) to use only pure-bred, registered sires in the production of farm animals, so far as possible; (2) to advocate the general use of such sires; (3) to work for the betterment of pure-bred sires in breed character, individual excellence, quality, size, soundness and prepotence; (4) to discourage the use of grade, mongrel or scrub sires and all sires and dams, irrespective of breeding, that are diseased, hereditarily unsound, physically unfit or undesirable in conformation and character. Each member will be expected to print this pledge on the back of his business cards, distribute these widely and discuss the matter with his patrons and neighbors.

Second Rate Science in Agriculture.

A correspondent, who believes that farming is better learnt at the plough than at an agricultural college, writes :—

Depend upon it, a man who is a second-rate or third-rate scientist is injured rather than benefited by his knowledge, unless he keeps it as a pastime and hobby. Very interesting in itself, and sometimes useful, but not unmixed with danger when it is applied in opposition to established practice. I have heard old, practical men, well known as leading agriculturists regret that they had not the opportunity in their young days of learning the science of to-day ; but it is not improbable that had they been trained in chemistry and botany, geology and anatomy, one of two things would have happened to them—either they would have drifted out of the ranks of agriculture altogether, or they would have been different, and not so strong as they now are. It is possible I may be wrong, but my own opinion is that if a man wishes to stand high as an authority on agriculture, he had better keep his science in the background.

The principal effect of scientific knowledge is to produce teachers of scientific agriculture ; but, when a man actually engages in agricultural pursuits, he finds himself so held by the practical problems of business, that the Latin names and the chemical formulae begin to sound strangely inappropriate to his surroundings. He feels as though he had been provided with a razor to cut firewood. — Exchange.

Welding Iron and Steel.

For welding iron and steel a composition, consisting of iron filings 40 parts, borax 20 parts, balsam of copaiba or some other resinous oil 2 parts, and sal-ammonia 3 parts, is used. They are mixed, heated and pulverised. The process of welding is much the same as usual. The surfaces to be welded are powdered with the composition, and then brought to a cherry-red heat, at which the powder melts, when the portions to be united are taken from the fire and joined. If the pieces to be welded are too large to be both introduced at the same time into the forge, one can be first heated with the welding powder to a cherry-red heat, and the other afterwards to a white heat, after which the welding may be effected. For welding cast steel, take borax 10 parts, sal-ammoniac 1 part, and grind or pound them roughly together. Then fuse them in a metal pot over a clear fire, taking care to continue the heat until all spume has disappeared from the surface. When the liquid appears clear, the composition is ready to be poured out to cool and concrete ; afterwards, being ground to a fine powder, it is ready for use. To use this composition, the steel to be welded is first raised to a bright yellow heat ; it is then dipped among the welding powder, and placed in the fire, until it attains the same degree of heat as before ; it is then ready to be placed under the hammer.—" Town and Country."

The Milch Goat.

While the milch goat has long occupied a useful place in a number of old-world countries, it is only slowly butting its way into favor against a good deal of prejudice in Australia.

Goats can be kept in a small space. They are easily maintained and are very cleanly. They give a moderate amount of milk ; two goats will supply an ordinary family with milk. Goats' milk is claimed to be an ideal human food, and is especially beneficial for dyspeptics and infants. The milk does not taste " goaty," but the taste for it must be acquired. The milk, however, is not cream-yielding and does not make good butter. Goats breed once a year and have two and sometimes three young at a birth.

Hand Saw on Large Timber.

To cut across the narrowest amount of wood is the most effective, or, at least, the most rapid way of cutting with a hand saw (says a correspondent of the " Wood Workers' Review "). This fact is not generally recognised ; or, to be more precise, it is usually ignored, and people waste much energy by keeping the saw at the same plane right through a heavy bit of timber. For instance, let a 6in. board be sawed flatwise ; that is, so the board will be cut across the broad side ; then afterwards turn the board up on edge, and cut it off by sawing the short way through it. It will be found that, on an average, the board can be cut in two much quicker when the teeth pass the short way through the board. Therefore, the lesson to be thus learned, is, that when sawing a large piece of wood, to so use the saw as to avoid the teeth all touching across a broad surface at once, and to contrive to make as short a cut as possible. In order to do this in the most practical manner, a piece of timber, of very considerable size, should be cut by beginning at one corner, and sawing to a reasonable depth. Then change the slant of the saw ; then, as the cutting edge of the saw will begin to touch a wide surface, again shift the saw to another position, or slant. In this way, the timber will positively be cut in two one-quarter to one-half quicker than if it were kept at one angle all the way through.

Government Work in Relation to Rural Life.

Agriculture, as an industry, is fundamental. The ability to produce the greatest amounts of these products with the least loss from preventable causes should be included among the aims of governmental activities, writes the " Agricultural News." To preserve the health of its subjects should be also a matter of concern to a government ; for whatever may be the agricultural possibilities of any locality, these are not likely to be fully realized while deadly diseases play havoc with the health of inhabitants and of domestic animals. These facts are becoming more and more realized, and the important bearing of entomological knowledge on the productivity of agricultural and other districts, especially in the tropics, is increasingly apparent. The results that have been achieved already in combating the insect pests of agricultural crops, and the control of disease, are sufficiently striking and important to direct attention to the enormous possibilities along these lines.

A little vanity is a good thing in a man. It will usually keep him from going to town collarless and coatless.

Many a girl who can not thread a needle regards herself fully competent to thread her way through life with a man whose buttons she could not possibly sew on.

Are Defective Udders Hereditary?

A correspondent writing to "Hoard's Dairyman," states that he has a cow that has a defective quarter, and is rather a disagreeable milker all around, but is kept because of her generous butter production, and adds that "One of her heifers developed into a very nice dairy cow and a pleasant milker. Her heifer in turn comes to milk, and, although she developed a fine udder, one quarter proved to be entirely useless, and the mate teat was very disagreeable to milk.

A year later this cow's sister came to milk and was equally disappointing as one teat would yield nothing but a little blood and never gave a drop of milk. At the time of calving this heifer carried as pretty an udder as one would care for. Now I would like to know if those two heifers took their weakness from their grandmother, or was it just a "streak of luck" that both should show up the same weakness? What chances do you think I would take in raising the last dropped calf? If she in turn would take after her grandmother, I would be pleased.

What is your opinion of giving cows sulphur after calving to reduce swollen udder? I have found it to be the greatest remedy I have ever tried for reducing a swollen udder at time of calving or any other time, but lately have been a little afraid that the treatment had a tendency to reduce the size of the udder, even after it became normal.

The amount of sulphur given a cow is about a small teacup full once or twice a day in the feed (which is eaten freely for about two days, except in a severe case, when it is continued until the cow is physicked some, when the udder will relax freely. With this treatment I have never found it necessary to resort to any washing of the udder at any time.

I might mention here that I have seen some very bad cases of swollen udder, caused, I believe, entirely from bathing with various washes, whereas I have cured similar cases nicely by keeping the udder perfectly dry, and feeding a little sulphur in the feed as mentioned. By so doing, I have had hardly any trouble for years with swollen udder or lost teats, except in the cases here mentioned.

To which our contemporary replies: "Whether or not these defects were hereditary depends greatly upon whether or not the quarters in question have developed normally before parturition. If they have not developed to a normal size and filled with milk, I should conclude that it is hereditary; but on the other hand, if they have properly developed and filled with milk at the time of parturition and the outlet was obstructed, I should conclude that it was an accident, which could be remedied and is not hereditary: therefore could not be transmitted to its offspring.

Sulphur is a laxative and an alterative, and as such it does some good indirectly, but is not known to do any particular harm in these cases. It is only natural for a cow's udder to swell before parturiton, which swelling usually disappears without aid. In cases of mastitis, the hot fomentations are indispensable, but washing with vinegar and salt brine are almost invariably injurious to the udders, and produce prolonged swellings and hardening of the udder.

How Old is Your Horse?

There are four ways to tell the age of a horse, according to an expert of the Oregon Agricultural College. By his teeth, by his ribs, by the flesh on his tail and by the skin on his cheeks.

In a young horse the check skin is soft and elastic, and flies back quickly when raised. In an old one it is lifeless, and goes back but slowly.

Old horses apparently have a wider and more distinct space between their ribs than young ones. And with age the flesh on the tail of a horse shrinks, making the joints more distinct than they are on a young horse.

Judging by the changes in the teeth is a more accurate method. The coming of the temporary teeth first and then the permanent ones: the development to maturity: the change in shape on account of wear; the coming of the dips in the teeth and their wearing away afterward: and the change in the angle of meeting of the teeth, from straight together at five years to a sharp angle at twenty—all these are signs by which the experienced horseman can read accurately the age of a horse.

"It must be remembered that the permanent teeth, above and below, come in at the same time," says Prof. Potter, "but the cups above do not wear away until all the cups below are gone. It must also be remembered that the changes begin at the centre and contine at the rate of one pair a year; that a horse at maturity, which is at five years, has everything; that is, all his permanent teeth and all the cups. If one remembers this much he has the whole thing in a nutshell." H

The Rusty Tin Can.

A Danish Co-operative Creamery is said to have solved the question of rusty milk cans by buying some ten extra cans and loaning these to the patrons while their rusty cans are sent to be retinned at the expense of the creamery—the patrons. This puts it absolutely in the buttermaker's own hands to decide when a can needs retinning; he simply retains the defective can and gives the patron the loan of one of those belonging to the creamery. The expense in this case does not amount to more than one-fiftieth part of a penny per 1,000 pounds of milk."

Polled Shorthorns.

The American Polled Shorthorn, or Durham, as it is more usually called, is said to have originated from the cow Oakwood Gwnne 4th, registered in vol. xv. of the "American Shorthorn Herd-book," which was bred by W. S. King, of Minneapolis, Minnesota, May 12th, 1873. She had but very slight horns or scurs. Bred to Seventh Duke of Hillhurst (34,221) she produced twin female calves that developed true polled heads. When bred to Bright Eyes Duke (31,894) she produced a red bull calf that was polled. The three polled animals were purchased by W. S. Miller, Ohio, in 1888, and with them he developed a family of pure polled Durhams.

Atavism.

Atavism—the recurrence of any peculiarity or disease of an ancestor in a later generation—can lay dormant, perhaps for a century or more, but it is bound at some time or other to come to life again, and atavism applies to all organisms. When this fact is impressed on the mind and stays there, studbreeders will cease to wonder at the occasional break-down of their preconceived notions. Without mentioning names, says a writer in Elder's Review," I will quote examples of this that have occurred within my experience in some of the best-known flocks, dating from thirty to sixty years back. In one case the ram was mated with ewes specially picked out to reproduce the most desirable qualities. amongst the ewes was a noted prize-taker that had already guven birth to two lambs, both rams, which promised to equal their sire in all his best points. Consequently the third lamb was anxiously looked for. When it appeared it turned out to be again a ram lamb, most peculiarly marked with black and white stripes. The ewe had never been out of the stud paddock except to be shorn. Besides there was not such a thing as a black ram anywhere around the run. The owners could not account for it. To guard against a possible mistake in the future, the lamb was killed before it left the yard. A second instance happened many hundreds of miles from the first. Again one of the best stud ewes in the flock, a champion prize-taker two years in succession, mated with a grand champion ram, gave birth to a ewe lamb with a brownish face. The pedigree of sire and dam was undeniable. The lamb was kept to see if the mark would disappear. By next year it had got rather darker, but she had such a fine fleece that the owners decided to send it to the show, merely to obtain an expression of opinion from the judges. To their astonishment, the hogget ewe obtained first prize, the judges evidently not giving sufficient consideration to the brown face. For further experiment sake this ewe was mated with her sire. The result was a black lamb. Whose was the fault —on the sire's or dam's side? I think it was on the latter's side, as the rest of the ewes mated with the same ram all threw white lambs. At the same time, both ewe and ram were descended from a ram used in the flock twenty-one years previously. These two instances of atavism should prove the difficulty of building up a stud flock on the assumption that once a good foundation has been laid the rest is easy. There is a vulgar saying: "Every dog has his day." But it is aptly applicable to stud-breeding, and we see plenty of instances of it in the show and sale yards. But with a good stud-breeder it is always a case of the dog coming to life again. It may take, perhaps, two or three years, but he will soon find out what ewe or ram is responsible, and out of the flock he or she will have to go.

The man who is constantly changing his mind usually has little to change.

Seed Selection.

The most important field for the plant breeder is in the improvement of the established varieties of crops by the production of strains approximating more uniformly to the best types of these varieties, says a writer in an American agricultural paper. This lack of uniformity in high productive capacity is responsible in great measure for the present low average yield of most of our crops in the United States. It is due to the variability of the plants of these varieties, which is more evident in the cross-fertilized crops than in the self-fertilized ones. In the case of corn this variability of plants is particularly striking. It is the experience of most corn breeders that it is not possible to produce on an acre more than 5 bushels of uniform ears even of our most improved strains. A large majority of the plants produce ears of small size, irregular shape, and light weight. Many of the stalks are barren. Only a small proportion of the plants produce the maximum size and weight of ear. In the cornfields of the central Mississippi Valley the corn is usually planted in hills, 3 feet 6 inches apart in the row. The rows are arranged 3 feet 6 inches apart, and the hills checked so as to permit cross cultivation. This arrangement provides for 3,556 hills to the acre. An average of about 3 kernels is planted in every hill. If every kernel produced a uniform plant and the plants bore uniform ears weighing 1 lb. each, the yield per acre would be about 10,668 lbs., or about 155 bushels of shelled corn per acre. The fact that the average yield of this section is less than 40 bushels per acre is striking evidence that only a small proportion of the plants bear ears of the maximum weight.

A great deal of this variability and lack of uniformity of the corn plants can be overcome by sys-

tematic selection of the best seed ears year after year, and the propagation of this seed alone, so that there is no danger of crossing with the undesirable types of plants or inferior varieties of corn. This fact has been fully proved in the production of varieties by many years of continued selection of the seed which has been found to be more productive and profitable for culture than the unselected or unimproved sorts. The gradual increase in yield of corn in Illinois, Iowa, and other great corn-growing States during the past ten years can safely be attributed in no small degree to the use of the improved varieties produced in these sections by breeders.

An Instance of Careful Breeding.

In Jersey the birth of a calf may, indeed, be immediately officially registered, but the entry in the Herd Book is a matter for the future, and is only accomplished after the animal has been inspected and criticised by a committee of inspectors, three in number. Committees, whose members are constantly changing, visit the various districts of the island at intervals, and then adjudicate upon the worthiness of the young stock that are brought before them by the breeders, and they give or withhold the imprimateur of entry in the Herd Book. There are many rules and regulations by which they are guided, but the principal among them seem to be (1) that every bull calf, to be seen as a yearling, must be accompanied by its dam, so that the character of the latter may be weighed in considering the merit of its offspring; and (2) that no heifer, whatever her pedigree, will be looked at until she has borne a calf, as then only can her capacity as a milk-producer be observed. After passing the judging committee each animal receives a certificate of qualification, and must be either commended or highly commended, so that the breeder, without the expense and trouble of exhibiting at an agricultural show, is able to obtain the soundest and best opinion as to the comparative merits of his young stock. Of course, such a system is only possible in a small and easily-organised island like Jersey, but, none the less, it is a monument to the clear-sightedness of its originators, and a credit to the zeal and energy of those who still carry it out.

Climatic Conditions.

The commonest topic of conversation wherever Australian farmers foregather is the state of the weather, what it has been, what it is, and what may be expected in the near future. It is natural that it should be so, for the farmer may be said to plough weather, to sow weather, and to reap weather. His living, in a great measure, depends upon the weather; small blame to him then if he talks and thinks of it more than any other subject. The farmer must make a careful study of the climate of the region in which his lot is cast, for it is by a knowledge of the climate of the locality that he is able to realize what crops are likely to succeed, and what is of equal if not greater importance, what crops he cannot grow with any prospect of success. This knowledge is not very easily attained, and often it is only after a long series of years that the resources of a locality are fully understood. It is often said that "climate beats culture," but he who relies on climate trusts to luck, while he who places his depenhence on culture invariably comes out better in the end. The business of the husbandman is as much influenced by climate as that of the agriculturist, and a close study of the climatic conditions of the locality in which he lives is of the greatest importance. A very curious illustration of this was given by Professor Sanson. A farmer on one side of the River Rhone established a dairy herd of Dutch cattle. The cows throve well, and yielded a large quantity of milk. Induced by the success of this dairy, a farmer on the opposite side of the river endeavoured to establish a similar dairy herd, but without success. His cattle did not thrive, and they yielded very little milk. The cause of this non-success was a puzzle. The conditions of life in the two places were apparently identical; they were at the same altitude, and the cattle received equal care. Professor Sanson, however, soon discovered the cause of the failure. In the second dairy the cattle were exposed to the prevailing wind which was of a very drying nature, from which the first farm was protected. This difference, which was scarcely noticed by the residents accounted for the success on one farm and for the failure on the other.—Elder's Review.

Tight shoes are a sure panacea for all other troubles. The man whose footwear pinches him will soon cease to worry about anything else.

Poultry Notes

— Mating. —

It is always rather a difficult task to satisfy oneself in the selection of birds for the breeding pen, but it is one which has to be accomplished, for upon it depends to some extent success or failure. There is, however, one absolutely infallible rule and that is: keep the best for oneself. To knowingly do otherwise is simply a fool's game. There is, of course, one little difficulty, and that is to know which is the best, and it is one which, unfortunately, it is impossible to entirely overcome. Trap nests or single pens may have told us something, observation possibly a little more, but there still remains a great deal which we shall not know till the numbers go up. If anyone should tell you that to mate a high scoring hen, if she is healthy and vigorous, to the son of an equally high scoring bird enjoying equally good health and spirits, is a certain road to success and a flock of little high-scorers, you can tell him, with all the odds in your favor, that the truth is not in him. Do it politely, of course; especially if he happens to be much larger than yourself. Many would-be competition winners who have travelled that road are now wondering what hit them.

— Dual Purpose Birds. —

A well attended and most interesting meeting, one which may be followed by important results, was held during the month, the purpose being to consider a scheme for placing the breeding of the all-round breeds on a more satisfactory footing than is the case at present. The proposed competition, as submitted to the meeting by Messrs Laurie and Manuel, appears perhaps a little complex and long drawn out, also there are one or two difficulties in the way as the arrangements stand. It is, for instance, quite impossible for the same pullets to be in two place at once, yet this will be necessary if the date of the next competition is altered as has been suggested. Even if this is not done, the preparation of the birds for the show, the necessary handling and travelling will, we imagine, not be regarded by them as the best sort of preliminary canter for the serious work at Parafield. Still any difficulty of this sort can easily be got over. The meeting, wisely we think, voted the idea a good one, and promised to support the committee, which now has the matter in hand, and of which Mr. E. J. Todd, of Franklin, is hon. sec. The success or otherwise of the scheme will, of course, depend on breeders themselves. There is a lot of enthusiasm at present, and we hope that the future will reveal an equal amount of stick-to-it-ishness. The Government are expected to provide the sinews of war; in other words, the prize money. This appears to be a reasonable expectation, for it certainly owes the general purpose bird a bit. It has been said that the authorities killed the dual purpose bird and its breeder by throwing it out at Roseworthy. This, we think, is not quite correct, for they began the slaughter by taking up the breeds at all and cutting into, perhaps only apparently, what little business the private breeder had to encourage him. The dropping business was, at most, a final nail in the coffin.

— Why a Menagerie? —

The official assurance of the Poultry Expert that he does not intend to have a menagerie at Parafield is in one sense comforting, but the legitimate inference that he had one at Roseworthy appears to be a little rough on the "any other breed" brigade, since they constituted part of the poultry stock at Roseworthy, but will not, it is said, find a place at Parafield, and must therefore have been the menagerie. We are told that to give a dog a bad name is equivalent to hanging him, probably the result of calling an Orpington a menagerie is something equally unpleasant. What's in a name? ,,ell. a good deal, and whilst breeders will be duly grateful to Mr. Laurie for his assistance in the attempted resuscitation of the "all-round" bird, as per the suggested competition, they will not forget that he had a lot to do with providing the corpse.

—Wanted: A Report. —

Now that the Roseworthy Poultry Experiment Station has been closed readers will await with interest a record of what has been done during the past five years or so. What systematic experiments have been conducted, and what conclusions established, with such data as may be necessary to enable the ordinary poultryman to profit by the work done. Progress reports would prehaps have been a more desirable plan, but that possibility, however, has passed, and the full report, which is, we suppose, being prepared, will it is hoped prove a valuable contribution to poultry literature. Cornell University has published the records of important experiments in poultry feeding; Guelph College on fattening; the Hatch Experiment Station has dealt fully with moulting; Maine Experiment Station with the heredity of laying capacity; Theale College has contributed to our knowledge of the results of comparative chicken feeding; Hawkesbury College, on the incidence of laying in poultry and ducks; &c., &c. What has Roseworthy done? We have frequently been asked the question, but, owing to what seems a mistaken policy, no one seems able to answer it. Silence is no doubt a virtue at times, but in this case it seems to have been unnecessary, to say the least of it.

Almost of equal interest will be the publication of the Murray Bridge Poultry Station report and balance sheet. Beyond the meagre statement

that it was commercially successful nothing appears to be known of what was done, how it was done, and perhaps, especially, why it was done, or, if done at all, why ended? To be successful seems a queer reason. Perhaps it was the shock!

— What For? —

We seem doomed to ask questions this month. Straws, we are told, show which way the wind blows. Well, a pretty bulky one is showing that a little more public money may be chucked away on single bird testing at the next competition. A year ago our inspired friend "Breeder,' 'in one of the weeklies did a feeble bleat because "a recently imported authority" from foreign parts (first time we heard W.A. so described) had sat on a proposal to spend a mere couple of hundred pounds on putting up single testing pens for competition birds at Roseworthy. It is to be hoped that the aforesaid authority will take the trouble to jump on the latest proposal to accommodate 300 single birds at the new Parafield test, and do it with both feet. If there is one thing the private breeder can do more easily than another, it is single testing,and if there is one thing more than another which he would find it difficult to demonstrate the value of it is single testing, beyond, of course, the elementary one of detecting barren hens, soft shellers, and general "blighters." Public money should be spent for the public good, and though it may interest the owner to know the individual scores of his birds, it would be difficult to point out its real help to him and certainly impossible to show that it was of the slightest interest or value to poultry breeders generally, or to those who pay the bill—the public. Assume that one pen averages 250, and that the lowest score is 240 and the highest 260. A good pen, of course, and close going. Assume again another pen averages 250, of which the individual scores are 200, 220, 240, 260, 280, and 300. Once again, please, assume a third pen with three birds at 200 and three at 300. These figures cover the limits of probable variation, and what good are they, or rather, would they be, if they represented ascertained facts? Add, subtract, multiply, divide them, they still remain figures. Is there a single glimmer of light thrown on any of the problems of poultry breeding or poultry keeping? Then, of what use are they? None. Then why trouble to get them? Poultry breeding is not an arithmetical problem, and until there is any evidence to show that any definite natural law exists governing the transmission of the laying habit, it won't be. There is only one test of a breeding hen, and that is to try her.

— Just So. —

It is gratifying to know that our Poultry Department is pleased with itself. We deduce this beatific though possibly inappropriate state of mind from the following par. in the official report of the last competition:—"The fact that general averages are so good will once more flatly contradict the opinion of some uninformed persons in other parts of the world that our system of breeding, &c., will lead to deterioration. In this regard our latest test again shows that South Australia is still in the lead."

Just so, but in which direction? Perhaps the following figures in connection with the last Gatton, Burnley, and Roseworthy competitions may throw some light on the subject:—Highest pen score, Gatton, 1534; Burnley, 1465; Roseworthy, 1413. Average gross return per bird, Burnley, 19/7; Gatton, 19/5; Roseworthy, 16/3. Average eggs per bird, Gatton, 207; Burnley, 195; Roseworthy, 182. Good old lead or miss lead! It has just occurred to us that perhaps the writer was referring to the following: Worst score, Roseworthy, 656; Burnley, 895; Gatton, 968. If so, we apologize. Anyway, good old lead. The Roseworthy end of those figures, plus the general prevalence of ovarian troubles, plus the arrival of the barren hen, plus a ten per cent. disqualification for small eggs, seems a pretty feeble sort of brick to heave at certain "misinformed persons," for as a matter of fact and most unfortunately the smile seems to be with them.

— A Queer Idea. —

The financial statement issued in connection with the last Roseworthy competition does not err on the side of amplitude of detail, that is, important detail. We are given the cost of food, and the price of eggs, that is, the price they would have realised in a market 30 miles away, and in effect told to make the best of it. Well, what we make of it is a 25 per cent. difference. We are then blandly informed that: "There is no need to publish a balance sheet showing the whole cost of a competition. It will be readily understood that an educational undertaking is not run on strictly commercial lines." This would,of course, be a reasonable view if the "educational undertaking" had to do with, say, the habits and customs of prehistoric man, or even the "Turkey Trot," but surely, in what is supposed to be a public investigation in regard to commercial poultry keeping, the question of costs demands a little more emphasis than it receives. It is true that at the back of their minds most people remember that though that 10/10 alleged profit is the truth, it is not exactly the truth, the whole truth, and nothing but the truth. There is certainly a tendency to unduly inflate the probabilities of commercial poultry keeping, in the figures as presented in these reports. Again we are told that "the system inseparable from laying competitions would be too expensive for a commercial plant." If so, of what use are competitions? Possibly the question is suposed to be answered in the following quotation: "As a fine advertisement of one of our coming and valuable State industries and of the State as a whole, one cannot sufficiently appraise their value." Seems a pity not to make an effort, anyway,and express the result in figures; so many people would prefer them to vague generalities.

Poultry on the Farm.

"Why is it that so few of our farmers' wives raise pure-bred poultry?" asks a writer in an American poultry paper. "They," he continues, referring of course to the wives and not the poultry, "as a rule, are very active and painstaking, are quite enthusiastic in the pursuit of poultry raising. Most of them read some good journal and in every issue see one or more articles setting forth the claim that pure-bred poultry can be raised as cheaply as the common stock, and are worth much more in the markets. Still they cling to their mixed breeds, and through the long winter months patiently wait until spring for eggs to come. Nineteen-twentieths of the poultry crop comes from the farms, hence we must conclude that from a practical point of view they must know a thing or two about poultry raising.

Most of our country poultry raisers labour under the false impression that pure-bred poultry cannot be raised and keqt pure so long as their common stock is kept on their premises. To such I would say that it is just about as easy to raise pure stock and keep them so with hundreds of mongrels around as if you had them alone on your farm. The only precaution necessary is to pen up the breeding birds during the breeding season, which lasts but three months. The rest of the year they can range together. Should some few of your mixed fowls be high flyers clip their wings and they will not intrude upon these grounds. Seems as if most people should know this, yet many do not."

What is What.?

There is much confusion about breeders' terms, and some are difficult or impossible to accurately define, but the following will give readers a sufficiently clear idea:—

Pure-bred.—A pure-bred bird is the progeny of parents of the same well-defined and recognised breed.

Crossbred.—A crossbred bird is the progeny of parents of different breeds, one at least of which must be pure-bred.

First Cross.—A first cross is the progeny of the parents of two distinct pure-bred varieties. Strictly speaking the word crossbred should be restricted to first crosses. For example, a pure Game male and pure Dorking hens produce the Game-Dorking cross and, as both parents are pure, the progeny are first cross.

Second Cross.—If a pure Game cock is crossed with the above first cross, the result is still called a crossbred, but it is a second cross, akin to what the sheep-breeder calls a come-back, and is called a Game-Game-Dorking cross; or if it were the other way about, i.e., a Dorking male with the Game-Dorking cross, the result would be a Dorking-Game-Dorking cross.

If we crossed hens of the above cross with a pure-bred Orpington cock, we would get Orpington-Dorking-Game-Dorking, and such a mixture is really a mongrel, but it is usually spoken of as a cross, because the one parent is a pure-bred bird, and the composition of the other parent is known.

In the same way, when a pure-bred cock of any kind, is crossed with hens of unknown parentage, the progeny are, strictly speaking, mongrels, but it is customary with many to speak of them as a cross breed.

Mongrel.—Strictly speaking, any bird not of pure parentage is a mongrel, and the word, according to Webster, is almost synonymous with crossbred. But among breeders, not only of poultry, but of dogs and other animals, a mongrel is the progeny of mixed or unknown parentage untrue to any type.

If a farmer has a mixed lot of "barn door" fowls, i.e., mongrels, and mates them with, say, a good pure-bred Minorca cock, the chicks would still be mongrels, but he would be understood were he to call them Minorca crosses, and many of the pullets would show the Minorca type very decidedly. Were he to select the pullets showing the Minorca tendency, and mate them with another pure-bred Minorca male bird, he would get a larger percentage with a still more pronounced Minorca type, and if these were again mated with a pure-bred Minorca cock, most of the pullets would be undistinguishable from pure Minorcas, although the cockerels would probably be less true. Three generations of a pure-bred male of a fixed breed, like the Minorca, Leghorn, or Langshan, mated with selected mongrel hens and their progeny, will fix the type of pullets fairly well, but it takes longer to fix the male type, and in the case of the pullets, a cock of known pure breed must still be used to keep up and raise the standard.

Value of Skim Milk.

The West Virginia Experiment Station has made some systematic tests to prove the value of skim milk for laying hens. The first tests covered 122 days. The 22 hens fed on skim milk laid 1,244, as compared with 996 eggs laid by the 22 hens fed mash wet with water. In another test, 60 hens fed on the skim-milk ration laid 862 eggs in 37 days, as compared with 632 eggs laid by a similar lot fed on no skim milk. Other tests gave about the same comparative results. The conductors of these experiments estimate that under the prevailing conditions, and with eggs selling for 1/- per dozen, the skim milk used for moistening the mash had a feeding value of one penny per quart. That milk is one of the best general foods for almost all stock, and human beings, too, is recognized by everybody, and needs no special proof. That it should have better results in nutrition than just plain water is really self-evident, but the above places a definite money value upon it.

The Successful Man.

The successful poultryman is the one who understands his business. The most successful are those who cater to buyers who will pay high prices for high quality, whether they really like to or not. But quality alone will not fetch the highest price. It requires business acumen of a superior kind to sell even the finest grade of poultry and eggs at a good profit over and above all the items of unavoidable cost.

If the proprietor of a shop be laid up by sickness or accident, someone must keep his business going or he must close his store. In either event his stock will not depreciate much in value during the period. But a poultryman's stock may be ruined by a few weeks of rank mistreatment or neglect. If he has done all his own work, or had it done by thoughtless and unskilled help under his constant supervision, what will happen, when he is laid up from any cause?

To omit cost of labour is a most grievous mistake in all cases where the figures are to show the net profit in a business. Poultry-keeping, as a rule, is not a business. It is not a business on the average farm; unless, indeed, the raising of weeds is a business. When fowls are kept for pleasure, or merely to supply the home with eggs and meat, their keeping cannot properly be termed a business.

Nearly all novices and prospective poultry-keepers talk glibly of "going into the poultry business," and of "the profits in poultry business." Usually, when they figure the prospective profits, they set down the lowest feed-cost per hen that they ever heard of; the highest egg yield per hen yet reported; figure the eggs at the highest average market price; and triumphantly display a very attractive "net profit."

Lakenvelders.

Reply to C.J.—There are not, as far as we know, any birds of this breed in South Australia. Some were, we believe, sent out to a Victorian breeder some years ago, but whether they have died out or not, supposing they ever arrived, we do not know. The breed is not a new one, having been largely bred in Holland, of which country they appear to be natives, for many years, and they are, or were, some few years ago, fairly popular in England. They are of Leghorn type, and in colouring are black and white. There is, as far as we know, only the one variety. The name is derived from laken, which, in Dutch, means a sheet and veld a field. The origin and apropriateness of the name is the same as in the "sheeted" or "belted" cattle which are also known as Lakenvelders. Judging by such illustrations as we have seen the birds are handsome, having white bodies with black hackles, tail and wing ends. They are said to breed quite true to type. From a utility point of view an English breeder writes:—They are very hardy and active little foragers, and altogether the breed seems to combine many desirable qualities. As table birds they handle well for this class of fowl. I don't remember ever taking hold of a small, active laying bird such as these are, that had such a plump, well-shaped breast, and they kill out a nice plump fine quality table bird, but of course, they are small. They develop very rapidly, being fully developed at seven months or thereabouts." With regard to the wisdom of importing, if you merely want a pretty, interesting bird, which will probably lay as well as its neighbours, and perhaps kill and dress a little better, the answer is by all means, Yes. If however, you should happen to expect that they will immediately become popular, and that you will be overrun with orders for stock and eggs, just disabuse your mind at once. There is plenty of room in Australia for a popular utility fowl, but to expect that popularity (and profit) under five years' work and a couple of 1,500 scores at the competitions with a general average of 180 to 200, is to lay one self open to quite a lot of disappointment. They lay white eggs, are non-sisters and have slate blue legs.

Capons.

Reply to "Interested."—Your question is a long one, but the answer is short. It is No. You can tell your Teutonic friend who assures you that he "has seen thousands of 20 lb. capons and eaten some," either that he is a plain and simple perverter of the truth, or you can qualify the statement with any adjective which may seem appropriate. Incidentally, we should say that it would be wise to refrain from asking him to dinner. Writing from personal knowledge (though of some years ago) of capons in the markets of Paris and Brussels, where the finest table poultry in the world is sold, we can assure you that they did not average half that weight, and in numbers did not amount ! two per cent. of the whole; yet from what one reads the capon was more popular twenty years ago than to-day. The act of caponizing does not increase the size of a bird (a gelding may live for 20 years and yet be no bigger than his entire brother, both are limited to the fixed dimensions of the breed) or even improve the quality. It merely prevents the deterioration which normally takes place through sexual influences. It does not in any sense alter the class and character (as table poultry) of the birds operated on., If you castrated a Jersey calf, you would not expect it to turn into a Shorthorn steer. In the same way, a Leghorn remains a Leghorn and does not develope the table qualities and peculiarities of a Faverolle, a Dorking, or a Game; so that your little scheme for converting Leghorn cockerels into prime table poultry won't work. All there is in caponizing on the score of quality is that if you take two prime table birds at four months, caponize one and leave the other, treat them alike, in twelve months the one will be as good a table birds as ever it was, whilst the other certainly will not. From a financial point of view there does not seem to be much in it. Roughly speaking, poultry flesh costs 1d. a week or 4d. per lb. to grow. A lb. a month is fair average growth, so at 4 months your cockerels will have cost 1/4. At 6d. per lb. nett they will be worth 2/. Suppose similar birds to be caponized, and to make 10 lb. at 10 months, and we get 3/4, for which at the same rate you get 5/. After that such birds become a losing proposition, or do so as soon as they make their full growth, for they still go on eating at 1d. per week (it would probably be nearer 2d.), but make no gain in weight. We do not pretend that the figures quoted are more than somewhere near the average. If you grow lucerne, keep a butcher's shop, and have a round of private customers, your costs will be reduced and your receipts be greater. On the other hand, if you live far from market and buy all food, they will be greater. Anyway, we should need to do some close figuring with full knowledge of all the facts before recommending extensive table poultry breeding, with caponizing as a special feature.

With regard to the rest of your questions. We do not know of anyone who would undertake the work professionally, nor do we know what any such person would consider "a fair thing." Much of this work is done in France by men who travel from village to village, and they charge, so we have read, 5 francs a hundred, roughly, ½d. each. We do not know of anyone much interested in the subject in Adelaide. We remember that Mr. Laughton took the matter up at one time, and we have seen him do some very quick, clean, and successful work. It is not considered a difficult process; on the other hand a certain amount of delicate handling and dexterity is necessary. We recollect Mr. F. W. Marshall taking a dozen fine chicks in to a medical student friend. The experiment was not brilliantly successful, as only one lived to get home, and even that passed out in a day or so. We do not quote this to discourage you, but merely as an incident. The average mortality with competent handlers is estimated at from 2 per cent. in cold weather to up to 8 in the hot months. That is, of course, European experience. Caponizing was a little talked of some years ago, classes provided at the Show, &c. In this connection rather an amusing incident occurred. As the judge wos handling one of the birds it nearly paralyzed him by crowing violently, which of course no self-respecting capon is supposed to do. Poor brute, like the song of the dying swan, it proved to be his last, for as in duty bound the judge reported that "it was a he, whereas he should have been an it." The committee, also as in duty bound, sat on the culprit and called upon the owner for an explanation. Said owner mildly suggested, we believe, that it might be a case of ventriloquism, but willingly consented to a post-mortem. Dr. Angas Johnson, if we recollect aright, officiated at this ceremony, and reported that the bird had undoubtedly been operated on, and that it was a case of, we forget the complaint, possibly lapsus linguæ.

Careless Poultry Keeping.

Even in these days of high prices, one sometimes hears it said that poultry does not pay. This, on the face of it, is a rank absurdity, that is if the said poultry is given even half a chance. It may be, and probably is quite true, that for a farmer in decent circumstances, they are not worth while, or, as a burly specimen from Yorke's Peninsula informed us a week or two ago, "They are too much variegated trouble." No doubt, from the poultry farmer's point of view this is a highly desirable state of mind. The consumer, however, may be pardoned if he regards the situation differently. Even the big farmer would probably alter his mind as to the trouble, or come to the correct conclusion, viz., that it was about the best paid trouble likely to come to him, if he would give a little thought to

figuring out just what addition a couple of hundred decently bred and fed birds would contribute to the farm income. Can it be wondered, asks an American paper, that farm poultry does not pay gilt-edged profits. Is it possible that it could be otherwise? Take the average farm flock. What does it represent? Years of in-breeding, years of poor feeding, years of careless handling. The result must show itself in the end. The years of careless mating must bring disaster. As a rule the poorest birds are kept for breeding, the early maturing ones are sold because they are early and "there are always plenty coming on." Unfortunately they don't come quick enough, and these runts that are kept fall easy prey to diseases. Their slow development is still further retarded by being huddled in damp quarters, overcrowded pens and often kept in most unsanitary conditions, for what stimulus is there in a waster to encourage their keeper to give them better quarters? They won't lay because they can't; they are back to their old place which nature gave them, that is, they lay only in the spring and when they have laid their quota of eggs then, bird like, they must hatch them, and brood they will, no matter how they are treated, for they are beyond discouragement in this particular. Other causes are also at work in other flocks to pull them down. No attention is given to mating. All birds run together and they look after themselves. No attempt is made at compensating the defects of the hens by a male showing strong points in his make up where his mates are lacking, there is no attention given to know whether the males are hatched from the eggs of the best layers or not, no care is given to have them uniform in either color, shape or size. Let them run their own show is the policy and run it they do. The consequences are quite evident in the chicks, they are small little runts mostly feathers and bones, the best of them when dressed and plucked are tough skinned rawboned lumps of chicken carcasses weighing about three pounds, tougher to eat than bull beef, and about as tasty and as nourishing. What is there in them to encourage their stay on our premises? There is certainly much to discourage.

Embden Geese.

Reply to R.J.:—This variety of geese are pure white, with very soft and pliable feathers and with plenty of down, which brings a good price.

The Embdens are a large breed of geese, the adult gander weighing twenty pounds and the young ganders weigh seventeen or eighteen pounds. Adult and young geese weigh respectively eighteen and sixteen pounds.

They lay very large eggs, a hen being able to cover only five.

For meat the Embdens are as good as any other variety, but are not as good layers as some other breeds. Mr. J. H. Hobbs, of Paradise, had a nice flock of this variety some years ago. Probably there is some pure bred stock in the State, but we do not happen to know of any. Embdens are similar to other geese in their habits and food requirements. What did you think they lived on—clothes pegs?

Shelter Sheds and Fertility.

A correspondent wishes to know whether fertility is likely to be increased by confining the breeding pen either in a closed house or in a shelter shed during the cold weather. We do not know if the question has been tested in Australia, or even that it has been much discussed. Fertility with any ordinarily well bred and well fed poultry is usually so satisfactory that the question is hardly one of practical importance. If the cleanliness and accommodation of the house or shed were satisfactory, it is not probable that any effect, either favourable or adverse, would be noticeable ; on the other hand, if they were small, dirty, and vermin-infested, the effect of housing would certainly not be favourable. We believe that poultry keepers generally lay too much stress on the influence of the weather. Any cold we get in South Australia is not likely to do any damage. Certainly, if any rooster asked us for a shelter shed before attending to his duties, we should throw an axe at him and try to aim straight, and advise our correspondent to do the same. As long as a house is clean, dry, and draught-proof, it is all that poultry can reasonably ask for. It is possible that they might eat a little less food in a warmer house, but they certainly would not be any more healthy, nor do we think they would be any more profitable.

The Kybybolite competitions are sometimes quoted as illustrating the beneficial effect of housing. As it was rumoured that the site of the first competition was so moist that the birds had to be provided with life buoys and that they spent their spare time in fishing and wondering like so many avian Noahs, when the floods would abate, any comparison with what other birds under other conditions did, seems a little unconvincing. It is not, perhaps, necessary to say, that the life buoys were not mentioned in the official report, and so may be dismissed as an exaggeration, but it was, we believe, admitted that the site was not happily chosen.

Some rather interesting experiments in poultry housing were conducted some years ago at the Ontario Agricultural College. If, as shown in the report published, the ordinary fowl does not object to the cold of a Canadian winter, anything the Australian climate can do in that direction is not likely to even make her sneeze. The experiment extended over a number of years and a number of different types of houses were tried. At first they were built very warm and tight, and were heated artificially. After a time the stoves used for heating in winter were removed, as were the double windows. Subsequently more ventilation was given, and the houses were not closed at all until the frost froze the water in the drinking tins. This fresh-air treatment resulted in the birds being healthier and more vigorous, and did not lessen the production of eggs, which, of course, were much more fertile when incubated than those laid in the ill-ventilated houses. Finally four houses, representing the different styles of popular poultry houses, were built and tenanted, some being closely protected from cold air with draft-proof doors and windows, and others perfectly open, when it was found, in spite of the cold temperature of the country, that the birds in the most open houses were those that gave by far the best results, not only as to the laying of eggs, but as to the healthiness of the fowls. The warmest house furnished the poorest results.

Notes.

Have the brood coops large and roomy. This gives the hen space to move about and qe romfortable. She is also less liable to step on the chicks, as might be the case if the coop is small.

It is equally as bad to overfeed as it is to underfeed poultry. There should be regular hours for feeding, and never a feast to-day and a famine to-morrow be allowed.

A good dust bath does more to keep the chickens free from lice than does the occasional dosing with louse powder, and for this reason should always be a part of the poultry fixtures. Clean, dry dust must be used.

A method for keeping lice from troubling the poultry at night, is to suspend the roosting poles by wires from the rafters of the house. If the poles are smooth, the lice will not remain on them if they are there at all.

A cute American poultry breeder makes use of kites to protect his young chickens from hawks. He keeps several large box kites flying above his chicken yards and the hawks take no chances of an encounter with such uncanny looking birds. He got the idea from noticing how the hawks took to the woods when his small boy was airing his new-fangled box kite.

Epsom Salts.

The regular use of Epsom salts during the summer is beneficial to poultry in many ways. In the case of chickens, it is a fine precautionary measure against the ravages of warts or chicken-pox later on. One of our most successful poultry farmers was in the habit of giving salts once a fortnight at the rate of an ounce to five adult birds. If an ounce packet is given to every 10 or 12 head, however, the purpose will be served. It is best dissolved in the water used to mix the mash, or it may be given in the drinking water at the rate of a packet to a gallon. If the fowls are treated on these lines, they will give better results, and there will be little danger of losses from heat apoplexy.—Exchange.

Talk over your plans with your wife as you sit around the evening fire. You will be surprised to find how sound her advice is.

Pigeon Notes.

Diseases in Pigeons.

— Diarrhoea. —

The symptoms of this disease are a looseness of the bowels, sleepy look about the eyes, ruffled feathers over the frontal, and a dejected appearance of the subject.

Youngsters in the nest quickly succumb to this disease if not taken in time. When fanciers see that the droppings of their birds are watery the cause must be looked to at once.

A hot, close loft, imperfect ventilation, the accumulation of the droppings on the floor will all bring about the trouble.

The excessive partaking of water through eating too much salted grit in hot weather will also cause it.

New wheat will also cause it.

Mouldy grain will cause it, and particularly will it arise from birds eating food contaminated by their droppings.

In the breeding season birds will sometimes eat worm-castings. These cause the bowels of the youngsters in the nest to be free in the morning, but as soon as they get the hard grain in the crop and it passes through the system the droppings during the night are firm and solid. No uneasiness need be felt in these cases.

If persistent, look to the grain. If too new, change to something a little older. Whatever you do, avoid maize; this, if of poor quality, will induce diarrhoea more quickly than anything.

Try a little old baked wheat or good sound peas two years old.

A gentle aperient in the shape of a dose of castor oil will sometimes effect a cure if taken in hand at once. Diarrhoea is the forerunner of many evils.

When the droppings are loose and greenish two drops of chlorodyne will sometimes at once effect a cure, but when the disease affects the majority of the inmates of a loft the cause will generally be found in the food and feeding.

In some cases a teaspoonful of camphorated chalk added to a quart of water effect an immediate cure.

The disease is more common in hot weather, and bad ventilation and overcrowding will cause it.

— Eating Droppings. —

If pigeons are kept very short of food they will acquire the filthy habit of eating their droppings, particularly if any husk is passed, or if bad linseed is used, which through its hardness may be passed through the digestive tract in the same manner as small grit or stones that the gizzard expels.

A pigeon's teeth are in the gizard in the shape of grit, but here let me briefly describe the process it goes through before reaching the gizzard.

First of all, the food, after being eaten, passes through the gullet into the crop. It is surprising to what extent it swells. At the bottom of the crop is a receptacle which looks like a subterranean passage; that is the stomach of the pigeon, where the food eaten mixes with bile, and is still further softened before passing into the gizzard, where, as I have stated, mastication takes place, and if the food is good and the pigeon healthy, only waste matter is thrown off, and eventually is discharged in conjunction with urine from the rectum.

It is a very bad sign indeed for pigeons to pass the grain they eat through their system without digesting it. Depend upon it, there is something wrong either in the grain or the bird.

I have frequently found in the case of bad linseed and some other small seeds pigeons will pass them in this manner, and being passed whole the hungry birds will eat them again and at the same time eat their droppings. Plenty of good digestible food is the best remedy for the trouble.

Hawkesbury Competition.

In the May issue of the Agricultural Gazette of New South Wales Mr. D. S. Thompson presents his report of the eleventh competition. In it Mr. Thompson and his committee continue to place some valuable information at the disposal of poultry keepers in respect to comparative laying. In addition to the ordinary 1st year laying we have the record of 2nd and 3rd year laying in fowls, 1st, 2nd, 3rd, and 4th year laying in ducks, and of some subsidiary work in feeding, selection, and general purpose values. What a contrast to Roseworthy report, with its pen one year laying and—some piffle about advertising the State.

In the third year hen section we find that the winning total, for this the third competition, is 3,282, as against 3,293 in the second and 3,063 in the first. In the second year test, the winners' score is 2,373. It is interesting to note the second year figures during the six successive years this experiment has been in progress, they are, 124, 147, 140, 134, 140, 135. In the first year section the figures are very instructive, for the past six years the highest totals have been 1,474, 1,370, 1,394, 1,321, 1,389, 1,461, whilst the average per hen during the same period has been 173, 180, 181, 168, 184, 178. In the fourth year duck section the average laying is 106, as against 119 in their third, 166 in their second, and 185 in the first year's laying. In the third year ducks the winning score is 3,001 as against 3,183 in the previous test. In second year birds, the average laying is 176, as against 136, in the second competition and 175 in the first. In the first year ducks the winners, as readers are already aware, put up the excellent score of 1601. As the first egg was not laid in the pen till 11th of April, 1912. Mr. Thompson gave them another eleven days' run during which they added 30 to the tally, making the grand total for full twelve months 1,631. The average laying in this section is 202.7 per head for the 60 birds entered.

Mr. Thompson is to be congratulated on the interesting evidence presented in this report and on the admirable manner in which it is arranged.

The man who is always complaining that he is tied down is usually too much of an invertebrate to stand up.

Gatton Competition.

Gatton takes the competition bun this year with an average of 207 eggs for each of the 180 birds. The value of the eggs laid was £174 18/8, while the cost of food was £50 1/2. The birds are reported to have been a splendid lot, and nearly half of them were from new competitors or farmers. The great feature of the laying was the splendid performance of the Black Orpingtons; while the most unfortunate was the fact that two of Mr. Dalrymple's hens proved to be barren and did not lay an egg. The four remaining birds in this were fine layers, their record being 1.058 eggs in the 12 months, an average of 264.5 per hen.

With regard to feeding, the superintendent reports that, as in previous years, strict attention has been given to the feeding; this is essential where fowls are confined and everything has to be fed to them. We have not departed from our usual methods as recorded in past years, except that, being short of pollard and bran, ground wheat was tried for a few days; for a short period, too, dessicated meat being unobtainable, green bone was used instead. Roughly speaking the morning meal consisted of bran and pollard in about equal proportions, more or less bran according to the flouriness of the pollard, with 1 quart of desiccated meat or 1½ lb. of Sunlight oilcake mixed therewith on alternate mornings; this was mixed into a crumbly mash with separated milk. At mid-day, chaffed green lucerne and a little soup meat, when available, were given. At night; good sound wheat, with good heavy plump oats once a week by way of variety. No maize was used during this competition. Seashell grit was always kept in the houses, and fresh clean water was supplied each morning. The houses were cleaned out once a week. The amount fed varied according to the birds' appetites; they were given as much as they would eat up eagerly without leaving any; this is a good rule to follow. The mortality was very light; only six birds died during the twelve months.

The duck generally lays at night. It thrives best on soft, succulent food; strong, vigorous birds can be successfully bred at four years of age. When properly fed, green ducks, when eight weeks of age, will weigh nine pounds to the pair. At ten weeks they should weigh ten to eleven pounds to the pair.

Poultry on a Small Scale.

Though experts and theorists may question the wisdom of entering upon poultry keeping for a living, there can be no doubt of the profit to be made out of a few birds kept in the suburban home. Such birds cost comparatively little to feed and can be housed and attended to under conditions which are very favourable to the production of eggs. Figures are not always reliable, but the following, published by a Sydney poultry keeper, may be confidently taken as a guide to what may be reasonably expected :—

During the twelve months he gathered 245 dozen eggs, and these were sold at prices varying from 9d. to 1/8 per dozen, the average price being 1/2 per dozen. His feed bill for the year came to £5 10/-, and his net profit was £8 15/10. In addition to this sum clear from the eggs he had about £2 from the sale of cockerels, and he also had a small stock of pullets for the next year's operations. The feed right through the year consisted of wheat, maize, oats, and bran, with boiled liver three times a week. When the weather was cold a warm mash was given in the morning, together with a little wheat at mid-day. Every alternate night during the winter steamed oats with a handful of crushed maize constituted the meal. He adopted the plan of throwing the grain among the stable litter, so that the fowls had to scratch for it. They had green feed every day, and the run measured 16ft. by 150ft. for 18 birds.

Address Wanted.

Reply to "Will."—The address is R. Burns, Shadevale, Warwick, Queensland. The full score of his pen of Black Orpingtons at Gatton Competition was 1,534. Yes, they laid well in winter, if you can call any Queensland weather winter. The birds were not apparently laying when sent to the competion, 1st April, 1912. The monthly scores were 20, 97, 105, 164, 172, 163, 161, 155, 346, 118, 127, and 106. A fair distribution.

"The woman is the weaker vessel" men are fond of saying, but when it comes to endurance and patience she generally has her lord badly beaten.

Winter Eggs.

It is often said that anyone can obtain a full egg basket in summer, but winter management is a different thing.

Our Mary had a little hen,
So feminine and queer;
It laid like smoke while eggs were cheap,
But stopped when they got dear.

Yes, Mary's little hen is identical with many which we hear of around our own city and away on the farms in the country. Our hens should be business hens—the genuine commercial article. It is easy enough to make them businesslike in winter if we breed them right, feed them right and house them right. That is where some poultry breeders score and where others fail. For instance, if we allow the laying hen to do a perish in the cold, damp, draughty house at night, it takes all her food to provide heat for the body, and there is nothing left for the eggs; and if she is not line bred for egg laying she will not pay her way, no matter how she is fed and housed. These are the cardinal points which are of prime importance to success.

The way to get a plentiful supply is first of all to push the hens through the moult, and then to give them cosy, comfortable scratching sheds for wet, wintry days. The breeder with brains is up at sunrise, and feeds his hens on a nice warm, crumbly mash, well balanced with bran, pollard, meat meal or animal food of some kind for the cold weather. He feeds for eggs, and keeps his fowls busy. He does not allow them to camp under a wire fence; he has a dry, warm shed which gets the morning sun into it. The sun has an invigorating influence in cold weather. There is no trouble in doing the right thing—it is simply a matter of system. Now is the time to do it; there is no time like the present. Those who put off till to-morrow what can be done to-day are the ones who say poultry does not pay. They are the drones in the industry.

S.A. Poultry and Kennel Club Show.

The 39th Grand Show of the above club is fixed for June 27th and 28th, and an interesting and liberal catalogue has been issued by the committee, and one that will surely appeal to the most fastidious of fanciers. It is anticipated that this year's fixture will eclipse all previous efforts of the club, as already a vigorous application has been made for catalogues. The time for receiving entries closes on Saturday, June 7th, and these may be made to the secretary (Mr. Claude Winchester) at 23 Waymouth Street, from 9 a.m. to 12 noon, or Mr. L. H. Muecke, 31 Grenfell Street, from 7 p.m. to 10 p.m. Fanciers can show appreciation of the committee's good work by attending the show and also inducing their friends to do so.

The following are included in the list of officers for 1913:—

Poultry, Pigeons, and Canaries—Committee—President, George C. Braund, Esq; Messrs. L. H. Muecke, (chairman), W. H. Milford, Jos. Smith, J. H. Naismith, C. Von Einem, Jos. Hill, P. C. Manuel; Dogs—Messrs. R. E. P. Osborne (chairman), W. F. Blee, T. F. Haimes, H. G. Barnard, H. W. Sutherland; Hon. Treasurer, Mr. L. H. Muecke; Hon. Vet. Surgeon, Vet. Surgeon Desmond; Hon Auditor, Mr. F. J. Wimble; Secretary, Claude Winchester, 23 Waymouth Street, Adelaide.

The Maine Experiment.

The third section of the report of the Maine Experiment has been held over till next issue.

The man who once makes up his mind to depend upon his own resources, will be surprised to find how they hold out.

HOME NOTES.

The Herb Garden.

Assuredly no garden is so small that it cannot afford one little spot for what might well be termed the housekeeper's corner.

In it may be sage, which is needed in pork and poultry dressings, the broad-leaf English thyme for stews and soups, summer savory and sweet marjoram. Dill and terragon will improve the pickles, and of the latter may easily be prepared terragon vinegar, by pouring two quarts of good vinegar over a pint of the freshly gathered young sprigs. After letting it stand two or three weeks, strain, and if you wish it still stronger add more fresh sprigs. Strain again after two weeks and bottle for use.

Mint, too, should find a place in every housekeeper's garden. A sprig or two, either fresh or dried, put in the baking tin with lamb will give the meat and gravy a delicious flavour. We have, also, proved the value of a sprig of fresh mint chewed as an aid to digestion.

Parsley should never be omitted, as it may be used either green or dried, and for garnishing as well as seasoning. Many more are deserving of consideration, but individual taste and preference will suggest their choice. None of these will take much room in the garden, as but two or three plants of each will furnish enough seasoning for an entire year.

They are much more savory when gathered fresh for immediate use and they may be put up by oneself without the loss of flavour and no admixture of foreign substances By their aid the wise housekeeper may get much that will give variation to the menu the year round, and it will help in this way to solve one of the most vexing problems the average housekeeper has to deal with, for on the "trimmins" often rests the success or failure of her plans.

A woman may be never so gentle and soft spoken, but she is obliged to use flat irony when it comes to doing up a shirt.

Home Surroundings.

Have your farm home match the beauty of the surroundings, the glory of the skies, the attraction of th. fields, the splendors of the morning and the evening, writes "Farm Life." Too often the home is like a plague spot—a carbuncle on the fair face of Nature.

The home is not a sty, a kennel, a barn, or a workshop. It is a place where mortals live to fit themselves for eternal beauty which is their heritage. Don't be content with raising crops for the body; raise something to feed the soul. Remember, beauty is wealth, and you can raise it as easily as you can potatoes. The pioneer stage, with its hard struggle, is past. We are in a new era, now, where we can afford the home beautiful. It should be the most attractive place on earth—a precious memory for children in all the after years. I recall two homes—one is surrounded with flowers. It was beautifully transformed by the owner. In the rear, was a grove of spruce which he planted, himself. The rows were like aisles in grand temples. The trees were like columns, supporting that arch of green. That grove was full of play-houses and play-things. All the influences were purifying and inspiring. How the children loved that home, and when they went away, how eager they were to get back again, and when they grew up, they wanted to settle near it.

The other, is a bleak house, out on a great plain. There is the eternal grind. In the yard, not a bush or tree or flower. In the house, not a carpet or rocking chair, no pictures or magazines. It is work, work. The father is like one of the old slave drivers; the children, slaves. Results: Three beautiful girls were easily lured to the city. Anything was better, they thought, than such dreadful, dreary drudgery. The five boys left as soon as they could get away—only one amounted to anything. These boys might have been noble men, leaders in society, enterprising citizens. Father and mother are left alone in their desolation. Every child was as eager to get away as a convict to escape prison. Nothing could call them back. The man has his money, but the children are gone—sold! sold! by their own father. Does this pay?

A father once said to me, "I am having trouble with my boys. I have lost control of them, and sometimes they steal my money. I am afraid they are going to the bad." He wanted me to visit him. The man had built a fine store in a near by town, he had a half section of land, but was living in a miserable house, and his boys had to go to bed in a stuffy garret so low they had to crawl into bed on all fours. He never encouraged them or paid them anything. They worked hard and thought they should have some remuneration if they had to steal it.

Right here, let me say, the boy is a good deal as his father moulds him. A man should keep his promise to his son as most sacred, and on no account violate it. He should see that the son keeps his promise to him to the letter. Some fathers have written contracts with their boys so that everything will be in black and white, so that either can point out any lack on the other side. In contrast with the den above described, I visited a father who built a new house and saw that his boys had one of the finest rooms. I was visiting him and noticed that the two sons, sixteen and eighteen, were taking hold of the work as though they owned the place. They seemed to show good judgment, and acted as if the whole responsibility was on their shoulders. I congratulated the father. He said, "I pay that oldest boy eighteen dollars a month and the other twelve dollars. I want them to have some self respect, and feel that they are earning something and it teaches them how to take care of their money and then, we live for our children, anyway. What incentive would we have without them?"

Too often, children have less attention than the cattle and the horses. Oh! the shame of it. Strange, the parent can not look over into the future and see an ideal for that little toddler—a leader among men, crowned with riches and honor, his own life on a grander scale. Let the children associate with the pure and the beautiful. Have your home an Elysium. Have every attractive thing in and around it which can be made to grow—a charming array of trees, shrubs, and flowers. Children are influenced by their surroundings. Interest the boy in the finest flowers that bloom and he will be a gentleman and not a boor.

A man who thought that he was going to loose three calves, said to his three sons, "You may have, each of you, one of these calves, if you will save them." They did. How much they found out of the best way to raise stock. Two years passed and he said at the table, "I think I shall sell my three steers, to-morrow; they will bring fifty dollars apiece." The boys noticed it. He had to go away that afternoon; when he came back, there were not any steers. The boys said, "We will teach Dad to be honest." Children will get tremendously in earnest if you will let them study all out doors. The structure of the plant, the unfolding of the flower—grafting, budding, planting—all are so

much more interesting than poring over dull books.

Interest the boy in the choicest trees, shrubs, and flowers. Let him write their names on labels and tie them on till he knows them by heart. Let him study their history, interest him in the creation of new varieties, teach him the principles of hybridising, call out the Divinity within him. Let him understand that he, too, can be a creator, that he can call out of the unknown, things rare and beautiful which no other eyes have yet seen, and you have lifted him to a higher plane and given him a start worthy of his parentage, so plant and raise refinement and beauty.

"Oh bosh on your beauty!" did you say? "There is no money in it." Yes, but back in your soul, there is a lurking love for it after all. Sneer as you will, you love the beautiful; now go and raise a lot of it.

Home Hints.

A good-sized piece of common newspaper wadded in the hand beats all for rubbing up the kitchen stove.

If boiling meat is inclined to be tough, add a salt-spoonful of baking soda. This will also hasten the cooking of beans.

A handful of chopped onion or a sprinkling of powdered parsley is as much a complement of roast veal or pork as mint is of spring lamb.

When frying bacon, put a teaspoonful of molasses in the pan. The bacon then comes out crisp, brown, sweet, and devoid of that strong flavor which usually characterizes it.

A sewing hint: You will find that an ordinary letter clip, tied with a piece of cord six inches long to the leg of a sewing table, is of great assistance in holding one end of a seam while basting—for instance, the long seam of a skirt.

Man is an admirer of the beautiful. He invariably selects the umbrella that has the prettiest handle.

The man who is always poking his nose into other folks' business rarely has any of his own worth attending to.

If a woman paid as much attention to the picking out of a man as she does to a hat, how much happier she would be.

To soften leather, there is nothing so penetrating and softening as neat's-foot oil. It will enter where the other oils will not make a surface impression.

Put the pockets on the underside of kitchen aprons, and you will find that they are just as convenient for use and will not catch on door knobs and get torn.

Laughter is one of the greatest aids to digestion, and the custom prevalent in ancient times of having laughter excited at table by jesters was founded on true hygienic principles.

Use green shades of reading lamps? It is the most restful of any color to the eyes, and throws the light down on the table where it is needed.

Blankets should be washed in lukewarm, not hot, water, or they will shrink. They should be hung upon the line and firmly stretched full length, and a heavy weight fastened to each hanging corner to prevent the wind swaying and wrapping them into a roll upon the line. The weights hold them in shape, and when spread out in this manner they dry quickly.

For perfectly cooked rice, melt a teaspoonful of butter in a granite saucepan, put into this one and one-half pints of cold water, and a half-cup of rice (well washed), with a level teaspoonful of salt. Let this cook slowly for about an hour without stirring. This may be served as a vegetable, or sweetened and flavored after taking from the fire, the stirring even then to be done with a fork instead of a spoon.

It is when to-morrow's burden is added to to-day's that the weight is more than man can possibly bear.

If anybody has a pain, lay a bag of hot salt over the place. It is fine to remove the ache.

When the wind howls around the corner of the house, see that the cats and dogs have warm quarters.

If the child should by accident or otherwise get pepper or any other biting or smarting substance in his eyes, quickly apply fresh, sweet milk.

A heavy or late supper when tired out gives unrefreshing, troubled sleep, and heaviness and headache next morning. Light supper, long rest and sweet sleep.

To converse well is not to engross the conversation, nor is it to talk very brilliantly, but to have the tact to make others feel at ease—in short, to be as interesting to talk to as to listen to.

A good tooth cleaner and preserver is precipitated chalk and ground orris root. Clean white teeth and breath, like "sweet frankincense and myrrh," make up for many a deficiency in feature.

If your cellar is dark and you are afraid of accidents when going down the steps, have the last step whitened so that you may easily know when you are at the bottom. You can see this step plainly even in a dim lightf

In washing blouses or dresses made of washing silk, see that the garments are perfectly dry before they are ironed. Ironing them while wet makes them stiff and paper like, and if they are damped down after they are dry, the same effect is produced in unsightly patches, whereas if the silk is perfectly dry when ironed it appears as new.

To wash a motor scarf, soak it for a few minutes in a lukewarm soapy lather, and then knead it and squeeze it until it is perfectly clean. Rinse it in cold water to which a little salt has been added, and, without wringing the scarf, fold it in two in the middle of its length. Commence rolling the scarf, keeping the edges as close as possible, and after squeezing it lightly with the hands, set it in a warm place, such as in the plate rack, or in the oven at night, and keep it rolled until it is quite dry. The drying takes rather a long time, but the color is preserved, and the scarf is not dragged out of shape, and when the fringe has been combed the scarf is as good as new.

A cut lemon is a very useful addition to the washstand, as fruit and other stains can be removed by its use, and an occasional rubbing with a cut lemon after washing keeps the skin of the hands smooth and soft, and prevents chapping. There is one little precaution which must be observed, and that is, the lemon should never be left on a marble washstand with the cut surface downwards. The acid of the lemon juice decomposes the marble, turning it into chalk and leaving an unsightly white mark. Should such an accident occur, the mark should be rubbed as soon as possible with a well soaped flannel, on which a little salt has been sprinkled.

Tried Recipes.

— Apple Tart. —

Line a pie dish with puff paste, peel, core and quarter a dozen apples, and lay them in the dish with some blanched and pounded almonds. Beat quarter of a pound of butter to a cream, add a cupful of castor sugar and four eggs; beat all well together, flavour with pounded cinnamon, pour over the apples, and bake in a moderate oven for about an hour.

— Dessert Sweet. —

Boil a pint of sugar in half a pint of water to a syrup. Clarify by stirring in the white of an egg and boiling briskly till the syrup is frothy; then strain into little square paper shapes, after having mixed in some chopped almonds and grated lemon or tangerine orange peel. Serve when cold.

— Cocoanut Tart. —

Grate a cocoanut very finely, mix it with its weight in sugar, half an ounce or so of butter, an egg (first whisking the white separately to a stiff froth), and some cinnamon to flavour. Mix these ingredients thoroughly, and put them in a tart dish lined with puff pastry. Bake in a brisk oven.

— German Walnut Cake. —

Shell and chop finely about quarter of a pound of walnuts. Make a custard with a pint of milk, two eggs, and a tablespoonful of sugar. When the custard is made stir in the walnuts, and pour into a basin to cool. Cut a round sponge cake into three slices; put the bottom piece on a dish, cover it with a layer of the walnut custard, then put the second slice in, and so on. Coat with royal icing, and decorate the top with walnuts. This cake may be made with cocoanut instead of walnut.

—Marmalade Cream Tarts. —

Line some patty pans with puff paste, and fill them with the following mixture: To each tablespoonful of marmalade add the yolks of two eggs, the white of one, and the weight of an egg—i.e., about an ounce—each of sugar and butter. Whip all to a cream, three-quarters fill the tartlet tins, and bake in a hot oven for twenty minutes. These are eaten cold.

— German Tea Cakes. —

A pound of butter, a pound of flour, a pound of castor sugar, six eggs, fifty sweet almonds, four ounces of currants, half a teaspoonful of rock ammonia, or sal volatile, a teaspoonful of powdered cinnamon. Beat the butter to a cream; add the sugar and the eggs, one by one, beating all for about twenty minutes; then add the flour, cinnamon, and rock ammonia. Drop the mixture in spoonfuls on greased paper, sprinkle over with chopped almonds mixed with currants, cinnamon, and crystallized sugar, and bake for twenty minutes. These little cakes are very good.

— Cinnamon Cakes. —

A pound of flour, a pound of sugar, four eggs, quarter of a pound of butter, a dozen pounded cloves, a teaspoonful of powdered cinnamon, a teaspoonful of carbonate of soda, a teasponful of cream of tartar, and twenty-five almonds. Beat the butter to a cream, add the sugar and the eggs, and beat for twenty minutes. Mix the soda, cream of tartar, and spices with the flour. Form into cakes the size of a walnut, and put on a buttered tin. Bake for twenty minutes.

— Cape Plum Pudding. —

Required: Half a pound of flour, six ounces of raisins, six ounces of currants, six ounces of chopped suet, quarter of a pound of brown sugar, quarter of a pound of mashed carrots, quarter of a pound of mashed potatoes, a tablespoonful of golden syrup, two ounces of mixed peel, a teaspoonful of mixed spice, cinnamon, ginger, and nutmeg. Mix the flour, raisins, sugar, currants, and suet. Stir in the potatoes and carrots, add the treacle and peel, but no liquid. Boil in a mould for five hours, leaving room for the pudding to swell. Serve with brandy sauce. It is better to mix the pudding over night.

— Dutch Tea Cakes. —

A pound of flour, three quarters of a pound of butter, two ounces of dripping, quarter of a pound of sweet almonds, an egg, a teaspoonful each of carbonate of soda and pounded cloves, two teaspoonsful of powdered cinnamon, and a quarter of a pint of claret. Rub the fat into the flour; add the butter, soda, spices, the egg, and lastly, the wine. Roll the dough out, and cut into small cakes with a pastry cutter or a wineglass. Bake on greased tins, putting a piece of citron on each cake, for about twenty minutes.

— Roly-Poly Pudding. —

Mix a pint of hot mashed potatoes with a pint of flour, a quarter of a pound of butter, a pinch of salt, and moisten with milk or water. Roll out, spread with quince or other jam, roll up, and boil in a cloth for an hour and a half. Eat with the following sauce: Melt two ounces of butter with two tablespoonfuls of castor sugar; add a well-beaten egg; beat together, adding by degrees a little boiling water till the sauce looks like cream.

— Malay Minced Curry. —

Mince two pounds of meat, soak a large slice of bread in milk, squeeze it dry, and beat it up with the meat and an egg. Fry an onion in an ounce of dripping, add two tablespoonsful of curry powder, a dessertspoonful of sugar, the juice of half a lemon, a pinch of salt, and the prepared meat and bread, &c., and put the whole either into a buttered pie-dish or into small buttered cups. Beat an egg with half a pint of milk and pour over the whole. Stick a lemon or bay-leaf into each little cup. Bake and send to table in the cups or pie-dish. Serve with boiled rice.

— Cold Meat Curry. —

Fry a sliced onion in a tablespeenful of butter with two green apples cut in slices; simmer with a tablespoonful of curry powder and a tablespoonful of lemon juice. Soak half ounce of tamarinds in a gill of boiling water, strain, and add the water to the curry; it gives a delicious acid flavour, and may be substituted for vinegar or lemon juice. Take a dessertspoonful of sugar, half a cupful of stock, and two tablespoonsful of milk. Cut some cold meat into large dice, lay them in the mixture, and simmer for at least an hour till the meat is quite tender and thoroughly flavoured. Serve with boiled rice.

— Fish Pie. —

Remove all skin and bone from some cooked fish, break into small pieces, mix with a minced onion, previously fried in butter; add pepper, salt, mustard, tomato sauce, half a well-beaten egg, and pack into a pie-dish. Cover with mashed potatoes; brush over with egg. Bake for three-quarters of a hour.

— Veal Kidney Pie. —

Mince two veal kidneys with some of the fat that surrounds them, season with herbs; cloves, nutmeg, pepper, and salt and a little chopped celery. Put in a pie-dish with four hard-boiled eggs cut in slices, half a cupful of bread crumbs, a wineglassful o white wine, and a little stock. Cover with good crust, and bake for two hours.

OLDEST BEST

ADVANCE AUSTRALIA

AUSTRALIAN GARDEN & FIELD

ESTABLISHED 1875.

A MONTHLY JOURNAL OF AUSTRALIAN AGRONOMY.

VOL. XXXVIII. No. 12. {Registered for transmission by Post.} JUNE, 1913. Price 6d. | Or 5/- per annum posted

E. & W. HACKETT

Broad-Leaved Essex Rape.
Thousand-Headed Kale, Jersey Tree Kale
Rye Grass (Perennial and Italian),
Rib Grass, Crested Dogstail,
Paspalum Dilatatum, Phalaris Commutata
Rhodes' Grass, Couch Grass, Prairie Grass, Cocksfoot,
Chewing's Fescue. WATTLE SEED.
HUNTER RIVER LUCERNE. Arabian Lucerne.
Peruvian Lucerne.

LUCERNE.

WINTER FLOWERING SWEET PEAS, deliciously perfumed. In flower when Cut Flowers are particularly scarce. Splendid colours, rich and bright. A Great Acquisition, 6d., 1s. and 2s. 6d. pkt.

POLYANTHUS PRIMROSE, splendid colours, 1s. pkt.

FLOWER SEED

NOVELTIES.

PRIMULA, CALCEOLARIA, CINERARIA.

A Magnificent Assortment of PANSIES, choicest Show and Fancy, 1s., 2s. 6d. pkt; Large Flowering, mixed, 6d. PETUNIA, Superbissima, 1/- pkt.; Double Fringed, 1/- and 2/6 pkt; Large flowering mixed, 1/- pkt. MIMULUS, grandiflora, mixed, 6d. and 1/- pkt.

CYCLAMEN, Giant, Papilio, white 1/- pkt., salmon, 1 6 pkt.

PHLOX DRUMMONDI, Grandiflora, mixed, 6d., 1 - 2 6 pkt.

STOCKS (Beauty Stocks), separate colours and mixed,

"Bunyip" and other seed Wheat, Oats, Barley, Rye, etc.

Cabbage, Cauliflower, Lettuce, Brussells Sprouts, Onion, and all the best varieties in Vegetable Seeds.

CHOW MOILLIER

COCKSFOOT.

Sulphate of Potash. Kainit. Nitrate of Potash. Sulphate of Ammonia.
Garden Syringes. Slugene (Stanley's Slug Death). Pestend, for Slugs and Snails,
"DEMON" Bird Scarers, Cannon Crackers, and Fuse.

WHOLESALE AND RETAIL

SEEDSMEN, 73 RUNDLE ST., Adelaide.

Printed for the "Garden & Field" Proprietary by R. M. Osborne, 83-85 Currie Street, Adelaide.